United States
Department of
Agriculture

Forest Service

March 2013

Draft Environmental Impact Statement

Clear Creek Integrated Restoration Project

Moose Creek Ranger District, Nez Perce–Clearwater National Forests

Idaho County, Idaho

Draft Environmental Impact Statement

Clear Creek Integrated Restoration Project

Moose Creek Ranger District
Nez Perce National Forest
Idaho County, Idaho

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Abstract: *This Draft Environmental Impact Statement (DEIS) documents the analysis of four alternatives, including a "No Action" alternative. The Notice of Intent to prepare this document was published in the Federal Register on February 17, 2012. The Clear Creek Integrated Restoration Project proposes timber harvest, commercial thinning, precommercial thinning, prescribed fire, reforestation, native grass restoration, and road system improvements to achieve desired age class and species distributions and to improve watershed health. The proposed action was advertised for public scoping in January 2012. The Clear Creek watershed lies within the Selway–Middle Fork Collaborative Forest Landscape Restoration Program (CFLRP) area.*

Comments on this DEIS should be postmarked or received no later than 45 days after a Notice of Availability is published in the Federal Register. Written comments must be submitted to: Lois Hill, Interdisciplinary Team Leader, 903 3rd Street, Kamiah, Idaho 83536, telephone (208) 935-4258; or by fax to 208-935-4275. Electronic comments may be submitted by email. Email comments must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), and Word (.doc) to comments-northern-nezperce-moose-creek@fs.fed.u.s

Reviewers should provide the Forest Service with their comments during the review period of the draft environmental impact statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. City of Angoon v. Hodel (9th Circuit, l986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the draft environmental impact statement should be specific and

should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.

Send Comments to:

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Summary

The Nez Perce–Clearwater National Forests are proposing a combination of timber harvest, commercial thinning, precommercial thinning, prescribed fire, and reforestation to achieve desired age and size classes, species distributions, habitat diversity, and landscape patterns across forested portions of the Clear Creek drainage. Road decommissioning, culvert replacements, and road improvements are proposed to improve watershed health, and the restoration of 41 acres of bunchgrass communities through revegetation with native grasses and forbs is proposed to improve vegetative diversity. The project area comprises 43,731 acres of National Forest System lands within the Clear Creek drainage, located approximately 5 air miles southeast of Kooskia, Idaho.

The purpose of the Clear Creek Integrated Restoration Project (Project) is to manage forest vegetation to restore natural disturbance patterns; improve long-term resistance and resilience at the landscape level; reduce fuels; improve watershed conditions; improve elk habitat effectiveness; improve habitat for early seral species; and maintain habitat structure, function, and diversity. Timber outputs from the proposed action would be used to offset treatment costs, support the economic structure of local communities, and provide for regional and national needs.

Desired conditions for the Project area were identified after careful consideration of the existing condition of the area; applicable Forest Plan management direction, recommendations in the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001); and the needs, opportunities, and issues identified by a site-specific interdisciplinary watershed assessment and pre-National Environmental Policy Act (pre-NEPA) analysis conducted in 2011 for the Project area. Completing the Project will move the area toward a Desired Future Condition as defined in the Nez Perce National Forest Plan[1] (USDA Forest Service 1987b, pp. II-1 and II-2).

The Clear Creek Project is part of the larger Selway-Middle Fork Collaborative Forest Landscape Restoration Project. In 2010, the Clearwater Basin Collaborative (CBC) in partnership with the Nez Perce–Clearwater National Forests produced a comprehensive restoration strategy that was submitted for funding through the Collaborative Forest Landscape Restoration Program (CFLRP). This science-based proposal was designed to restore and maintain ecological conditions within the 1.4-million-acre Selway–Middle Fork ecosystem in Idaho. The Selway-Middle Fork CFLRP proposal includes the following goals:

[1] Forest Plan direction for this project is found in the Nez Perce National Forest Plan (USDA Forest Service 1987) since the project area lies within the administrative boundaries of the Nez Perce National Forest. The Nez Perce and Clearwater National Forests were administratively combined in February 2013, but the existing Forest Plans for each Forest will continue to guide management actions until the Forest Plans are revised. Revision of the 1987 Forest Plans is currently ongoing.

- Protect communities, private lands, and Wild and Scenic River corridors from uncharacteristic wildland fires
- Reestablish and perpetuate landscapes that are diverse and resilient
- Restore forest structure, function, and ecologic processes that promote aquatic health
- Restore forest structure, function, and ecologic processes that promote habitat for big game and other terrestrial species
- Contain or eliminate noxious weeds
- Promote landscape conditions that allow fire to function as the primary restoration agent
- Contribute to the economy and sustainability of rural communities

The Selway–Middle Fork area is identified as a top priority for restoration in national, regional, State, and County plans and in a forest subbasin assessment. The 43,731 acres of National Forest System lands in the Clear Creek watershed lies within the Selway–Middle Fork CFLRP area.

A Notice of Intent (NOI) advertising the scoping period was published in the Federal Register on January 6, 2012. A corrected NOI was published on February 9, 2012, updating the contact information that was published in the original notice. A second corrected NOI was published on February 13, 2012 extending the comment due date to March 1, 2012. A third corrected NOI, advertising two proposed site-specific Forest Plan amendments that are included in this Draft Environmental Impact Statement (DEIS), was advertised on February 7, 2013. The Clear Creek Integrated Restoration project has been presented at quarterly meetings with the Nez Perce Tribe since April 2012.

The project was presented for public scoping in January 2012. The following issues related to the project proposal were raised during scoping:

- Increasing patch sizes and reducing fragmentation
- Improving the distribution of hiding cover relative to foraging habitat
- Increasing the amount of early successional stands and wildlife foraging habitats
- Improving forest structure
- Providing jobs in Idaho County
- Reducing planning and implementation costs by managing on a large scale
- Reducing total road mileages and densities in the Clear Creek watershed
- Reducing sediment input to stream channels
- Reducing cumulative impacts of past timber harvest and road building on fisheries habitat, water quality, and soil productivity
- Reducing effects of the road network on elk security habitat
- Meeting Desired Future Conditions for watersheds, fish, and wildlife habitats

These issues led the interdisciplinary team to develop alternatives to the proposed action. This DEIS analyzes a total of 4 alternatives, including a No Action Alternative. The

alternatives are briefly summarized below. The issues and alternatives are described in greater detail in Chapter 2.

These activities are common to all action alternatives: 41 acres of grass restoration, 1,371 acres of prescribed fire, 1,887 acres of precommercial thinning, 119.8 miles of system road reconstruction, 13.2 miles of system road decommissioning, and two site-specific Forest Plan amendments adopting the Region 1 soil standard of 15% for detrimentally compacted, displaced, or puddled soils, and clarifying the definition of old growth found in Appendix N of the Nez Perce Forest Plan.

Alternative A (No Action)

This alternative provides a baseline for comparing the environmental consequences of the other alternatives. Under the No Action alternative, no project activities would be implemented.

Alternative B (Proposed Action, as Modified in Response to Scoping Comments)

This alternative was developed in response to the purpose and need for action identified during the pre-NEPA phase of project development. It was presented for public scoping in January 2012. Alternative B would move the project area toward the desired future conditions (DFCs) that were identified for the project during the pre-NEPA phase. In addition to the activities common to all action alternatives, Alternative B proposes 2,609 acres of regeneration harvest, site preparation, and reforestation; 331 acres of improvement harvest; 5,606 acres of commercial thinning; 8.7 miles of temporary road construction on existing templates; and 27.6 miles of new temporary road construction.

Alternative C (Maximal Species Conversion)

This alternative would address vegetative restoration needs described in the purpose and need for action but to a greater degree than Alternative B. Alternative C would regenerate as many stands as possible while meeting objectives for other resources. In addition to the activities common to all action alternatives, Alternative C would include 4,156 acres of regeneration harvest, site preparation, and reforestation; 331 acres of improvement harvest; 4,220 acres of commercial thinning; 8.7 miles of temporary road construction on existing templates; and 27.6 miles of new temporary road construction.

Alternative D (Minimal Road Construction)

Alternative D would address the need for vegetative rehabilitation in the Clear Creek watershed but to a lesser degree than Alternative B. Alternative D would use existing road templates as much as possible while still meeting the need for vegetative restoration. In addition to the activities common to all action alternatives, Alternative D would include 2,178 acres of regeneration harvest, site preparation, and reforestation; 211 acres of improvement harvest; 5,141 acres of commercial thinning; 8.7 miles of temporary road construction on existing templates; and 8.8 miles of new temporary road construction.

To help describe the environmental effects of each alternative as they pertain to the identified issues, the interdisciplinary team developed “indicators” that help measure the differences between the alternatives. The effects of the alternatives, as measured by these indicators, are summarized in Table S- 1.

Table S- 1 Summary of Environmental Consequences by Issue Indicator

Issue Indicator	Alternative A (Existing Condition)	Alternative B	Alternative C	Alternative D
Aquatics/Fisheries Habitat:				
Riparian Habitat Conservation Area (RHCA) Road Density	1.2 mi/mi^2	1.0 mi/mi^2	1.0 mi/mi^2	1.0 mi/mi^2
Number of undersized culverts replaced and cross drains added	0	77	77	77
FISHSED results for modeled changes in cobble embeddedness				
–Hoodoo Creek	33%	34%	34%	34%
– Solo Creek	31%	32%	32%	32%
– Pine Knob Creek	44%	45%	45%	45%
– Clear Creek	38%	39%	38%	38%
– Middle Fork Clear Creek	55%	56%	56%	56%
– Brown Springs Creek	30%	32%	32%	32%
– South Fork Clear Creek	11%	11%	11%	11%
– Kay Creek	18%	18%	18%	18%
Economics:				
Volume Harvested (CCF)	0	141,500 CCF	158,000 CCF	116,400 CCF
Volume Harvested (MBF)	0	75,300	85,200	61,800
Jobs Sustained	0	1,910 jobs	2,133 jobs	1,571 jobs
Community Harvest Income	0	$54,252,000	$60,578,000	$44,628,000
Federal Income Tax	0	$8,138,000	$9,087,000	$6,694,000
Fuels:				
Fire Regime Condition Class (FRCC)	FRCC2	FRCC2	FRCC2	FRCC2
Percentage of Crown Fire Susceptible Landscape	51%	44%	44%	44%
Soils:				
Acres of ground based harvest activity on landtypes with high sub-surface erosion	0	3,080	3,080	2,950
Miles of temp roads on landtypes with high sub-surface erosion	0	30 miles	30 miles	15 miles
Number of commercial harvest units requiring specialized design measures	0	77	78	75

Issue Indicator	Alternative A (Existing Condition)	Alternative B	Alternative C	Alternative D
Watershed:				
Percent increase in equivalent clearcut area (ECA) —Upper Clear Creek -South Fork Clear Creek -Lower Clear Creek -Clear Creek	 0 0 0 0	 15% 7% 8% 10%	 15% 7% 9% 10%	 13% 6% 7% 9%
Percent sediment yield increased over base (natural) as modeled by NEZSED – Pine Knob Creek – Browns Spring Creek – Clear Creek – Solo Creek – Middle Fork Clear Creek – Kay Creek – South Fork Clear Creek – Hoodoo Creek	 1.2% 2.0% 0.8% 1.5% 1.0% 1.5% 0.6% 2.4%	 16% 23% 7% 16% 8% 3% 5% 20%	 16% 24% 7% 16% 8% 3% 6% 21%	 16% 21% 5% 14% 5% 2% 4% 17%
Watershed road density(mi/mi^2) – Pine Knob Creek – Browns Spring Creek – Clear Creek – Solo Creek – Middle Fork Clear Creek – Kay Creek – South Fork Clear Creek – Hoodoo Creek – Big Cedar Creek – Lower Clear Creek Face	 4.8 4.1 2.3 3.5 2.4 2.6 1.6 4.6 4.6 1.8	 4.3 3.2 2.3 3.1 2.2 2.4 1.6 4.4 4.4 1.8	 4.3 3.2 2.3 3.1 2.2 2.4 1.6 4.4 4.4 1.8	 4.3 3.2 2.3 3.1 2.2 2.4 1.6 4.4 4.4 1.8
Wildlife:				
Acres of habitat treated – Black-backed Woodpecker	0	649	649	592
Acres of habitat treated– Fisher Winter habitat Summer habitat	 0 0	 3,334 637	 2,855 637	 2,013 495
Acres of habitat treated– Flammulated Owl	0	327	349	257
Acres of habitat treated– Fringed Myotis	0	146	146	125
Acres of habitat treated – Long-eared Myotis	0	674	674	487
Acres of habitat treated– Long-legged Myotis	0	674	674	4 87
Acres of habitat treated– Mountain Quail	0	35	35	35
Acres of habitat treated– Northern Goshawk Nesting	0	298	298	290
Acres of habitat treated– Pileated Woodpecker Nesting	0	875	875	772
Acres of habitat treated – Pine Marten	0	1,229	1,229	836

Acres of habitat treated – Pygmy Nuthatch	0	347	348	306
Acres of habitat treated– Ringneck Snake	0	493	493	389
Acres of habitat treated– Western Toad Uplands	0	59	55	63
Acres of habitat treated– Moose Winter Range	0	776	776	630
Elk Winter Range – Acres treated	0	4,380	4,502	3,809
Elk Summer Range – analysis areas meeting Forest Plan standards (50%)	7	7	7	7
Lynx Denning Acres Treated	0	105	83	58
Lynx Foraging Acres Treated	0	62	61	57

After considering the potential effects of the alternatives, the Responsible Official will select an action or mix of actions to improve ecological conditions in the project area and best meet the social values associated with this piece of land. If the No Action Alternative is selected, no other decision will be necessary. If an action alternative is selected, the Responsible Official will decide what mitigation measures, management requirements, and monitoring are needed for its implementation.

Document Organization

The Forest Service has prepared this DEIS in compliance with the NEPA and other relevant federal and State laws and regulations. This DEIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into 4 chapters:

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the DEIS

- *Appendices:* The appendices provide more detailed information to support the analyses presented in the DEIS. This DEIS includes four appendices: Appendix A includes maps of the project area, Appendix B describes proposed road work, Appendix C provides details about the proposed site-specific Forest Plan amendment to adopt the Regional soil standard, and Appendix D describes the proposed site-specific Forest Plan amendment for old growth.
- *Index:* The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Kamiah Ranger Station, 903 3rd Street, Kamiah, Idaho 83536.

Chapter 1–Purpose of and Need for Action

The Nez Perce–Clearwater National Forests are proposing a combination of timber harvest, commercial thinning, precommercial thinning, prescribed fire, and reforestation to achieve desired age and size classes, species distributions, habitat diversity, and landscape patterns across forested portions of the Clear Creek drainage. Road decommissioning, culvert replacements, and road improvements are proposed to improve watershed health, and the restoration of 41 acres of bunchgrass communities through revegetation with native grasses and forbs is proposed to improve vegetative diversity and reduce the spread of noxious weeds.

1.1 PROJECT HISTORY

Congress established the Collaborative Forest Landscape Restoration Program (CFLRP) with Title IV of the Omnibus Public Land Management Act of 2009. In addition to encouraging the collaborative, science-based ecosystem restoration of priority forest landscapes, the CFLRP has the following program goals:

- Encourage ecological, economic, and social sustainability
- Leverage local resources with national and private resources
- Facilitate the reduction of wildfire management costs, including through re-establishing natural fire regimes and reducing the risk of uncharacteristic wildfire
- Demonstrate the degree to which various ecological restoration techniques achieve ecological and watershed health objectives
- Encourage utilization of forest restoration by-products to offset treatment costs, benefit local rural economies, and improve forest health

The CFLRP established a fund to be used for restoration work on priority landscapes. Up to $4 million annually can be requested by selected projects. The CBC, in partnership with the Nez Perce-Clearwater Forests, developed and submitted a comprehensive restoration proposal, the Selway–Middle Fork Clearwater project, in 2010 (CBC and Forest Service 2010). The proposal outlined an ambitious strategy to plan and implement a number of projects, such as aquatic restoration, weed treatments, road decommissioning, fuel reductions, and forest restoration, across the 1.4-million-acre Selway–Middle Fork ecosystem in Idaho. The Selway–Middle Fork area is identified as a top priority for restoration in national, regional, State, and County plans and in a forest subbasin assessment. The Selway–Middle Fork CFLRP proposal included the following goals:

- Protect communities, private lands, and Wild and Scenic River corridors from uncharacteristic wildland fires
- Reestablish and perpetuate landscapes that are diverse and resilient
- Restore forest structure, function, and ecologic processes that promote aquatic health

- Restore forest structure, function, and ecologic processes that promote habitat for big game and other terrestrial species
- Contain or eliminate noxious weeds
- Promote landscape conditions that allow fire to function as the primary restoration agent
- Contribute to the economy and sustainability of rural communities

Proposals were reviewed in Washington, D.C., by the CFLRP Advisory Committee and 10 recommendations were forwarded to the Secretary of Agriculture for funding. The Selway–Middle Fork Clearwater project was selected for funding by the Secretary of Agriculture in August 2010.

At the heart of the proposal was the Clear Creek landscape, selected as a priority for treatment by the Forests and the CBC. In August 2010, Clear Creek was selected for an assessment to determine the types, locations, and amounts of appropriate management actions that would address CFLRP goals and objectives. The Interdisciplinary Team (IDT) prepared this assessment of the Clear Creek watershed in 2011; the assessment summarized Nez Perce Forest Plan direction appropriate to the Clear Creek area, compared existing landscape conditions to desired conditions described in the Forest Plan, and identified projects that would implement the CFLRP intent, while meeting, or progressing toward, desired conditions.

Projects recommended through the 2011 assessment would promote forest conditions that are resistant to forest pathogens and invasive species and resilient to wildfire and climate change; reduce wildfire risks on National Forest System (NFS)–managed lands that are adjacent to private property; promote healthy riparian and stream habitats important for fish and wildlife species; promote forest habitats that support productive populations of elk, moose, goshawk, pileated woodpecker, fisher, flammulated owl, and old forest habitats; develop a road system that provides administrative, recreational, and industrial uses while protecting sensitive habitats, minimizing sediment delivery to streams, and minimizing road construction and maintenance costs; and provide social and economic benefits to local communities.

Desired conditions for the Clear Creek watershed were developed using Nez Perce National Forest Plan (Forest Plan) (USDA Forest Service 1987b) direction; broad-scale assessments (e.g., Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin [Quigley et al. 1996] and Selway and Middle Fork Clearwater Rivers Subbasin Assessment [USDA Forest Service 2001]); and the best science currently available. The development of desired conditions for the Clear Creek project was periodically reviewed by the CBC for consistency with the CFLRP and to ensure that the project proposal was socially, ecologically, and economically robust. In the spirit of transparency, these same desired conditions were also shared with and input solicited from other routine Forest planning participants (e.g., Friends of the Clearwater and Alliance for the Wild Rockies).

During the pre-National Environmental Policy Act (pre-NEPA) phase of Project development, the IDT identified large polygons or patches within the Project area referred to as “Focus Areas.” The Focus Areas were identified based on a need to

promote similar age classes by connecting recently regenerated stands (preferably within the last 20 years). The intent was to establish breaks in continuous fuels, favor areas with known or developing forest health issues, and target over-represented mid seral and mature age classes. The IDT also attempted to bound these areas with identifiable features, such as forest type breaks, topographic breaks, and administrative boundaries. The Focus Areas served as the basis for developing the Proposed Action.

A new Focus Area, developed after the Proposed Action was presented for scoping, has been added to all of the action alternatives in this Draft Environmental Impact Statement (DEIS). It includes about 420 acres of regeneration harvest and some commercial thin and precommercial thin units lying outside of the original configuration of the Focus Areas. The new Focus Area includes 1.2 miles of temporary roads, some of which would be on existing templates.

1.2 PROJECT AREA

The Clear Creek drainage lies within the Middle Fork Clearwater River drainage near Kooskia, Idaho. The Clear Creek drainage totals 65,000 acres, with 33% (21,269 acres) in private or State ownership and the remaining 67% (43,731 acres) under the management of the Moose Creek Ranger District. The Clear Creek Integrated Restoration Project area includes all 43,731 acres of NFS lands within the Clear Creek drainage (Figure 1-1). All of the project area lies within the upper two-thirds of the drainage. The project area is located approximately 5 air miles southeast of Kooskia, Idaho, within Townships 30, 31, and 32 N, Ranges 5 and 6 E, Boise Meridian.

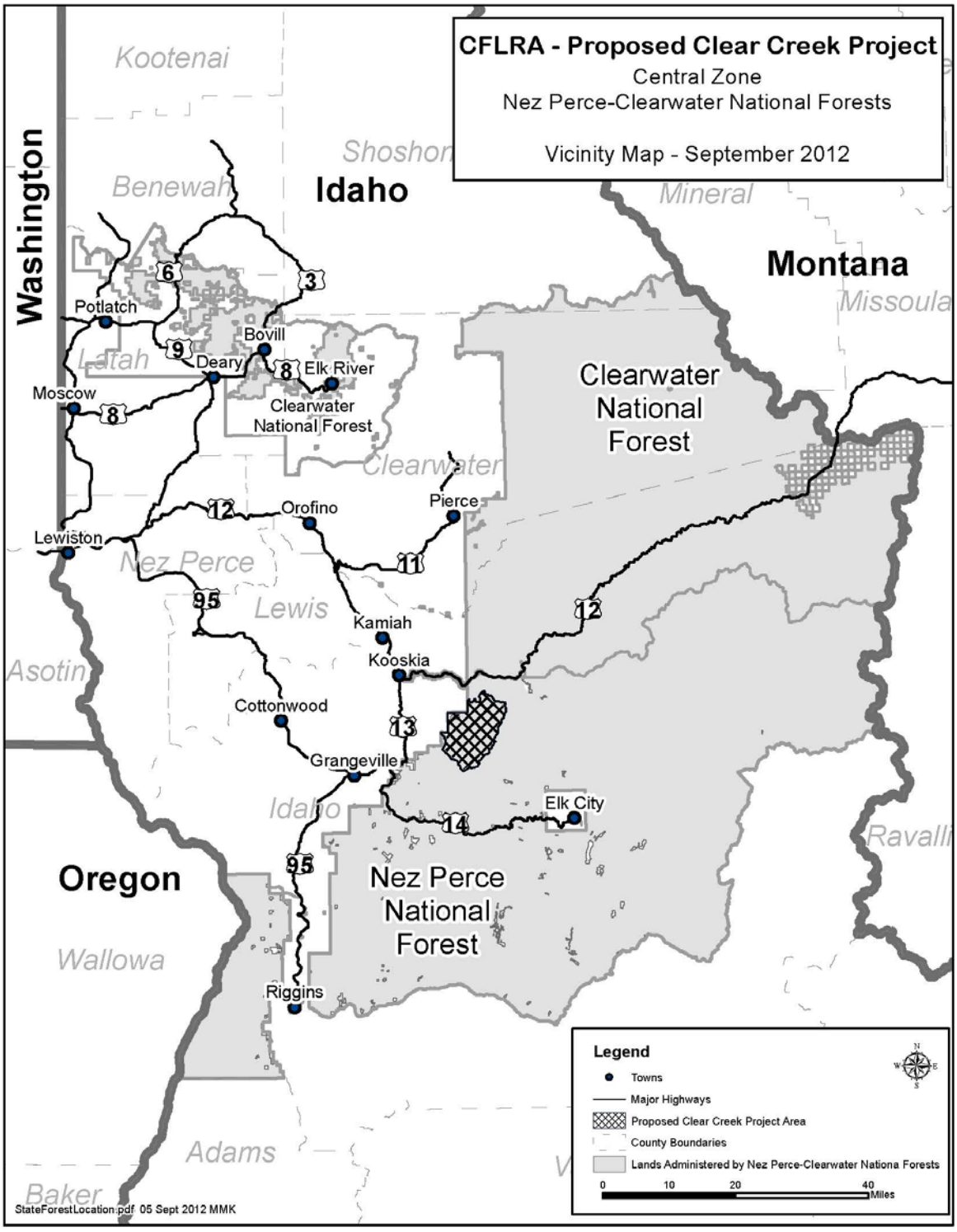

Figure 1-1. Clear Creek Integrated Restoration Project Vicinity Map

1.3 PURPOSE AND NEED FOR ACTION

The purpose of the project is to manage forest vegetation to restore natural disturbance patterns; improve long-term resistance and resilience at the landscape level; reduce fuels; improve watershed conditions; increase elk forage; improve early seral wildlife habitat; and maintain habitat structure, function, and diversity. These actions are needed to move resource conditions in the project area from existing conditions toward desired conditions. Timber outputs from the proposed action would be used to offset treatment costs, support the economic structure of local communities, and provide for regional and national needs.

The following resource management opportunities were identified for the Project area based on the existing condition of the area, applicable Forest Plan management direction; recommendations in the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001); and the needs, opportunities, and issues identified by an interdisciplinary watershed assessment and National Forest Management Act (NFMA) analysis conducted in 2011.

1.3.1 Vegetation and Wildlife Habitat Improvement

1.3.1.1 Existing Condition

Historic logging practices and fire suppression have affected the diversity of tree species in the Project area. Ladder fuels have increased, and a shift to more shade-tolerant species has occurred. Currently, a higher percentage of grand fir and Douglas-fir exist than natural long-term disturbances patterns would have created and that would have dominated these habitat types in the absence of historic logging and fire suppression. Grand fir and Douglas-fir are more susceptible to insects and disease and grand fir is less likely to survive intense wildfires than early seral species (e.g., ponderosa pine , western larch , and western white pine).

In addition to affecting species composition, young forest habitat is lacking on this landscape. Patches of young forest that do exist are smaller with edges that are straighter and more even than natural disturbances would have created.

1.3.1.2 Desired Condition

The desired condition is a forest structure with a range of age and size classes with species diversity that is resistant and resilient to change agents such as insects, diseases, and wildfires. Early seral species should represent a greater percentage of the species mix.

1.3.1.3 Need for Action

Vegetation in this area needs to be managed to create a more diverse and resilient forest structure by creating a range of age and size classes, species diversity, and disturbance patterns that more closely emulate the results of natural disturbance. A need exists to shift tree species composition away from shade-tolerant species toward more resistant and resilient early seral species. A need also exists to increase diversity within previously harvested areas to restore long-term habitat quality for sensitive and old growth-associated species and to manage vegetation to increase young forest habitat.

1.3.2 Goods and Services

1.3.2.1 Existing Condition

Much of the Project area consists of grand fir-dominated stands. Insect and disease infestations are contributing to increased tree mortality, while decreasing timber volume and value.

1.3.2.2 Desired Condition

The desired condition is to provide a sustained yield of resource outputs as directed by the Nez Perce Forest Plan.

1.3.2.3 Need for Action

Stands that are infested with insects and diseases need to be treated so that the harvested timber can provide materials for local industries.

1.3.3 Watershed Improvement

1.3.3.1 Existing Condition

Gravel and native surface roads could contribute sediment to stream channels, which can affect water quality and fish habitat. The road system in the Clear Creek watershed has already been substantially reduced. The West Fork-South Fork Clear Creek Road Decommissioning Decision Notice/Finding of No Significant Impact (DN/FONSI) (USDA Forest Service 2011) project decommissioned 85 miles of roads. However, additional road decommissioning opportunities are available in the Clear Creek watershed.

1.3.3.2 Desired Condition

The desired condition is to maintain a road system in the Clear Creek watershed that is adequate to provide for the goals and objectives described in the Nez Perce Forest Plan (primarily timber harvest, recreation, fire suppression, and administrative use).

1.3.3.3 Need for Action

Improving watershed function and stream conditions by reducing road densities and repairing existing roads and culverts to reduce sediment and improve drainage is needed. Watershed function can also be improved by restoring compacted soils and adding organic material on old skid trails and landings.

1.4 PROPOSED ACTION

The action that was proposed by the Forest Service for scoping in January 2012 is briefly described below. The Proposed Action was modified slightly in response to scoping comments that were received; the modified proposed action is described as Alternative B in this DEIS in Chapter 2.

Improve forest health, provide goods and services, reduce fuels and improve wildlife habitat:

- Conduct “variable retention” regeneration harvest and post-harvest burning activities on up to 2,500 to create early successional plant communities and

improve wildlife habitat while reestablishing long-lived early seral tree species. Variable retention harvest would include areas of full retention (clumps) with irregular edges. Snags and legacy trees would be retained to provide structure and a future source of woody debris. Openings would probably exceed 40 acres.

- Commercially thin approximately 7,810 acres to reduce stand densities, improve forest health, and reduce the chance of crown fire.
- Apply improvement harvest (thin from below) to approximately 311 acres to remove encroachment and ladder fuels from ponderosa pine–dominated stands.
- Construct a minimum temporary road system to carry out the proposed action. Roads would be decommissioned after use.
- Precommercially thin approximately 1,865 acres to reduce stand densities, improve forest health, and reduce fuels.
- Restore approximately 42 acres of bunchgrass communities through prescribed burning and revegetation with native grasses and forbs to improve vegetative diversity and reduce the spread of noxious weeds.
- Apply approximately 1,400 acres of low and mixed severity prescribed fire within the Clear Creek Roadless Area to restore natural fire regimes, reduce fuels, improve wildlife habitat, and create mosaic forest conditions. Proposed activities would be consistent with the Idaho Roadless Rule and no timber cutting is proposed within the Clear Creek Roadless area.

Reduce sediment production and address transportation needs:

- Maintain or improve approximately 100–130 miles of system roads. Maintenance and improvement could include culvert installation or replacement, ditch cleaning, riprap placement for drainage improvement, gravel placement, road grading, or dust abatement.
- Conduct additional site-specific maintenance or improvements on up to 20 miles of roads outside of proposed treatment areas to improve watershed conditions
- Remove from the system between 2–5 miles of system roads no longer considered necessary for transportation needs by decommissioning.

Amend the Soils section of the Nez Perce Forest Plan:

A site-specific, nonsignificant Forest Plan amendment adopting Region 1 soils standards would be included. The current Nez Perce Forest Plan standard specifies that there can be no new activities in areas where detrimental soil disturbance (DSD) is over 20%. Currently, Region 1 soil quality standards (USDA Forest Service 1999) specify that at least 85% of an activity area (defined as a land area affected by a management activity) must have soil that is in satisfactory condition. In other words, detrimental impacts (including compaction, displacement, rutting, severe burning, surface erosion, and mass wasting) shall be <15% of an activity area. In areas where >15% detrimental soil conditions exist from prior activities, the cumulative detrimental effects from proposed activities, including restoration, shall not exceed the conditions prior to the proposed activity and should move toward a net improvement in soil quality. The proposed

amendment would change Forest Plan Soil Standard #2 and allow activities to occur on areas with >20% DSD, as long as soil improvement activities are implemented.

1.5 DECISION FRAMEWORK

The Responsible Official for this project is Forest Supervisor, Rick Brazell. In making his decision, the Responsible Official will review the purpose and need, the Proposed Action and other alternatives, the environmental consequences, and public comment to make the following decisions:

- Should vegetation restoration in the Project area be completed, and if so, which forested stands should be treated and what silvicultural treatments should be applied?
- Should temporary roads be constructed, and if so, how many miles of road should be constructed and where should they be constructed?
- What design features, mitigation measures, and/or monitoring should be applied to the Project?

1.6 PUBLIC INVOLVEMENT

A Notice of Intent (NOI) advertising the scoping period was published in the Federal Register on January 6, 2012. A corrected NOI was published on February 9, 2012, updating the contact information that was published in the original notice. A second corrected NOI was published on February 13, 2012 extending the comment due date to March 1, 2012. A third corrected NOI, advertising two proposed site-specific Forest Plan amendments that are included in this DEIS, was advertised on February 7, 2013.

As part of the public involvement process, the agency also listed the proposal in the quarterly Schedule of Proposed Actions beginning April 2012. The Project has been presented to the Nez Perce Tribe at quarterly staff-to-staff meetings since April 2012. The CBC has been involved in project development since 2010 when the Clear Creek watershed was selected for assessment to determine the types, locations, and amount of appropriate management actions that would address CFLRP goals and objectives.

The Proposed Action was initially developed from preliminary issues, concerns, and existing conditions that were identified by the IDT. The IDT used issues raised by the public, other agencies, and the Nez Perce Tribe to develop the scope of the actions, alternatives, and effects to consider in the DEIS. Many of the issues were addressed through project design criteria and resource protection measures.

1.7 ISSUES

The Forest Service separated the issues into two groups: significant and nonsignificant. Significant issues were defined as those directly or indirectly caused by implementing the Proposed Action. Nonsignificant issues were identified as those outside the scope of the proposed action; already decided by law, regulation, Forest Plan, or other higher level decision; irrelevant to the decision to be made; or conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Section 1501.7, "…identify and eliminate from

detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…". A list of nonsignificant issues and reasons regarding their categorization as nonsignificant may be found in the project record.

1.7.1 Issues Used to Develop Alternatives to the Proposed Action

Several concerns were raised during scoping that were used to develop alternatives to the Proposed Action. To address these concerns, the Proposed Action was modified slightly and renamed Alternative B. Two additional action alternatives, Alternatives C and D, were also developed to respond to the concerns raised by scoping commenters.

1.7.1.1 Commercial Thinning Stands Where Root Disease is Present

Some commenters were concerned that commercially thinning stands with root disease could cause the disease to spread, increasing stand mortality.

The IDT created Alternative C to address these concerns. Under Alternative B, treatment would be deferred in stands proposed for commercial thinning that are found to have root disease. Thinning would not be an appropriate treatment in these stands because root disease would be likely to spread. However, without treatment, these stands are unlikely to remain on the landscape as long as desired; the stands available for management could be substantially reduced, and deferring treatment in commercially thinned stands with root disease would not move these stands toward Desired Future Conditions (DFCs). Under Alternative C, commercially thinned stands that are found to have root disease would be regenerated. Regenerating these stands would help create larger patch sizes, while increasing the amount of high-quality, early seral wildlife habitat and moving the area toward DFCs for young and old forest.

Issue Indicators:

- Percent of the area with forest cover type dominated by long-lived early seral species compared to grand fir and Douglas-fir.
- Patch sizes

1.7.1.2 Patch Sizes and Fragmentation

Some commenters were concerned that past management has reduced patch sizes and increased fragmentation in the Clear Creek watershed.

Since the 1980s, there has been a trend toward small, isolated harvest units that resulted in patch sizes that are smaller than would have been created through natural disturbance. The resulting forest now includes a fragmented landscape, isolated patches of young forest, and dissected large patches of older forest.

During the pre-NEPA phase of project development, the IDT identified large polygons or patches within the Project area, referred to as "Focus Areas." The Focus Areas were identified based on a need to promote similar age classes by connecting recently regenerated stands, or by retaining existing large patches of unfragmented forest. The Focus Areas served as the basis for developing the proposed action.

Since Forest managers cannot plan an activity to "create" larger patches of older forest, the IDT chose to focus on reducing landscape fragmentation by treating areas near or

adjacent to existing young forest. The resulting large patches of young forest will more closely resemble the disturbance regime and patch size expected from natural disturbances. At the same time, the IDT has not disregarded the importance of patch sizes in older age classes. Retaining existing large patches of unfragmented forest weighed heavily in the development of the Proposed Action. The IDT chose treatment areas that would avoid fragmenting existing patches that currently meet desired patch size conditions according to the DFCs for each Vegetative Response Unit (VRU). At the same time, it was a priority to "reconnect" areas of young forest that have become fragmented due to past management activities.

Other objectives the IDT considered during development of the proposed action were to establish breaks in areas with continuous fuels, to favor areas with known or developing forest health issues, and to target over-represented mid seral and mature age classes. The IDT also attempted to bound Focus Areas with identifiable features, such as forest type breaks, topographic breaks, and administrative boundaries.

The regeneration harvest proposed for all of the action alternatives would address this issue by increasing patch sizes and reducing fragmentation. Of the three action alternatives, Alternative C would do the most to address this issue because it would regenerate the most stands within the Focus Area configurations.

Issue Indicators:

- Patch size
- Fire Regime Condition Class (FRCC)

1.7.1.3 Early Successional Stands/Young Forest/Wildlife Habitat

Some commenters were concerned that the amount of young forest in the Project area should be increased to improve wildlife foraging habitat.

The regeneration harvest proposed for all of the action alternatives would address this issue by increasing the amount of young forest across the landscape. Of the three action alternatives, Alternative C would do the most to address this issue because it would regenerate the most stands.

Issue Indicators:

- Percent of the area with forest cover type dominated by long-lived, early seral species compared to Grand fir and Douglas-fir
- Percent of the area in each age class
- Vertical structure
- Acres treated in potential suitable habitat for sensitive species (SS)
- Acres treated in Nez Perce Forest Plan Management Area (MA)16 (Elk Winter Range)
- Acres treated in Nez Perce Forest Plan MA 21 (Moose Winter Range)

1.7.1.4 Forest Structure

Some commenters were concerned that the Forest Service should do more to move vegetation in the Clear Creek watershed toward the desired conditions identified for this area.

The desired condition is a forest structure with a range of age classes, size classes, and species diversity that is resistant and resilient to change agents such as insects, diseases, and wildfires. Early seral species should represent a greater percentage of the species mix. The regeneration harvest proposed for all of the action alternatives would address this issue by increasing the amount of young forest across the landscape, while reducing the amount of mid-seral and mature forest. Of the three action alternatives, Alternative C would do the most to address this issue because it would regenerate more acres.

Issue Indicators:

- Percent of Project area that could support a crown fire
- Percent of the area with forest cover type dominated by long-lived early seral species compared to shade intolerant species
- Percent of the area in each age class
- Vertical structure

1.7.1.5 Economics

Some commenters were concerned that the Project should provide jobs for the local economy. Other commenters suggested that planning and implementation costs should be reduced by managing on a large scale.

The IDT considered the entire Clear Creek watershed during the pre-NEPA assessment phase and when developing the Proposed Action. Timber harvested under any of the action alternatives would meet the goals and objectives of the Forest Plan to provide a sustained yield of resource outputs. Timber outputs from the Proposed Action would be used to offset treatment costs and support the economic structure of local communities and would provide for regional and national needs. Many of the stands proposed for treatment are currently losing volume and value due to insects and diseases. Harvesting the timber would provide materials for local industries.

Issue Indicators:

- Timber harvest–related jobs and income
- Sale feasibility

1.7.1.6 Road Densities

Some commenters were concerned about the total road mileages and road densities in the Clear Creek watershed.

No permanent road construction is proposed under any alternative.

Alternative D was developed to address these concerns by minimizing the amount of temporary road construction. New temporary road construction would be minimized by using existing road templates as much as possible. Units would be harvested as

described for Alternative B; some units would be dropped if they were not accessible by the more limited road system proposed for Alternative D.

Issue Indicators:

- Riparian Habitat Conservation Area (RHCA) road densities
- Number of undersized culverts replaced and cross drains added
- Reduction in watershed road miles

1.7.1.7 Elk Security Habitat

Some commenters were concerned about the effects of the road network on elk security habitat.

No permanent road construction is proposed under any alternative. Alternative D was developed to address these concerns by minimizing the amount of temporary road construction.

The road system in the Clear Creek watershed has already been substantially reduced. The South Fork–West Fork Clear Creek Road Decommissioning DN/FONSI (2011) decommissioned 85 miles of roads. Temporary roads constructed for the Project would be decommissioned and recontoured after use.

Issue Indicators:

- Percent of each Elk Analysis Area qualifying as secure habitat
- Elk Habitat Effectiveness Areas meeting Forest Plan standards using Leege (1984)

1.7.2 Concerns Raised in Response to Scoping

The Responsible Official reviewed the concerns below that were raised during the scoping. These concerns are valuable, but they do not raise unresolved conflicts with the Proposed Action and therefore are not treated as issues. Typically, these concerns have been addressed by incorporating additional mitigation or design features.

1.7.2.1 Collaborative Forest Landscape Restoration Plan Consistency

Because the project proposal is based on the CBC's Collaborative Forest Landscape Restoration Plan (CFLRP) proposal, some commenters were concerned that the project should be consistent with the requirements of the Collaborative Forest Landscape Restoration Act (CFLRA).

Project implementation will be consistent with requirements of the CFLRA, as well as all Nez Perce Forest Plan standards and other laws and regulations. The expenditure of CFLRA funds that will be used to implement and monitor this project will be reviewed for consistency by the CFLRP strategy group, composed of Forest Service and CBC members.

The EIS will analyze potential effects on old growth. The CFLRA requires that landscape restoration strategies "contribute to the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions of the forest type...", which will be accomplished through project design, unit

delineations, silvicultural prescriptions, and marking guidelines. The current, best available science will be used, as required by NEPA and CFLRA.

The CFLRA does not allow the construction of permanent roads, thus, permanent road construction is not proposed for this Project. Any new temporary roads constructed will be recontoured after use.

1.7.2.2 Old Growth

Some commenters asked that the IDT develop an alternative that would not harvest any old growth meeting Nez Perce Forest Plan or Green et al. (1992, errata corrected 2005, 2007, 2008, 2011) old growth criteria. Other commenters suggested that treatments in old growth stands should be considered if they would improve old growth habitat.

No old growth would be harvested under any alternative; although improvement cuts would be conducted in some old growth stands to help keep them on the landscape longer. Appendix D describes a site-specific Forest Plan amendment, clarifying the definition of old growth found in Appendix N of the Nez Perce Forest Plan, that is common to all action alternatives in this DEIS.

1.8 Regulatory Requirements and Required Coordination

As part of the analysis for this project, the IDT evaluated various alternatives under the laws, regulations, and requirements relating to federal natural resource management. Several of the design features presented in Chapter 2 were developed and incorporated to ensure these requirements would be met. The following sections summarize the results of the analysis for those concerns most often noted. Additional details can be found in Chapters 2, 3, and/or the Project Record.

1.9 Forest Plan Direction

Although the Clearwater and Nez Perce National Forests were administratively combined in February 2013, management of the lands formerly within the boundary of the Nez Perce National Forest will continue to be guided by direction found in the Nez Perce Forest Plan until the plan is revised. The Nez Perce Forest Plan (USDA Forest Service 1987b, as amended) includes goals, objectives, standards, and guidelines that direct management of forest resources. Forest Plan direction is established at 2 scales: Forest-wide direction is applicable throughout the Forest and management area direction ties specific goals, objectives, and standards to the unique capabilities of given parcels of land.

Nez Perce Forest Plan standards apply to NFS lands within the Nez Perce National Forest boundary. They are intended to supplement, not replace, National and Regional policies, standards, and guidelines found in Forest Service Manuals (FSM) and Handbooks and the Northern Regional Guide.

The project analysis was guided by the goals, objectives, standards, guidelines, and management area direction within the Nez Perce Forest Plan. This Project would help move the Forest toward desired conditions as described in the Forest Plan and other relevant planning direction.

1.10 CLEAN AIR ACT

The Clean Air Act, passed in 1963 and amended numerous times since then, is the primary legal authority governing air quality management. This Act provides the framework for national, State, and local efforts to protect air quality. The Montana/Idaho State Airshed Group was formed to coordinate all prescribed burning activities in order to minimize or prevent impacts from smoke emissions and ensure compliance with the National Ambient Air Quality Standards (NAAQS) issued by the Environmental Protection Agency (EPA), the federal agency charged with enforcing the Clean Air Act. The Forest Service, including the Moose Creek Ranger District, is a member of this Airshed Group. The Project area is in North Idaho Airshed Unit 12A. All post-harvest site preparation and fuel reduction treatments would be conducted according to the requirements of the Montana/North Idaho Smoke Management Unit guidelines.

1.11 CLEAN WATER ACT

Section 313 of the Clean Water Act requires federal agencies to comply with all federal, State, interstate, and local requirements; administrative authorities; and process and sanctions with respect to control and abatement of water pollution. Executive Order (EO) 12088 requires the Forest Service to meet the requirements of this Act. Therefore, all State and federal laws and regulations applicable to water quality would be applied, including 36 CFR 219.27; the Clean Water Act; the Nez Perce Forest Plan, including PACFISH Riparian Management Objectives (RMOs) and RHCAs; Idaho State Best Management Practices (BMPs); and Stream Alteration procedures.

1.12 REGION 1 SOIL QUALITY STANDARDS

Region 1 soil quality standards (USDA Forest Service 1999) specify that at least 85% of an activity area (defined as a land area affected by a management activity) must have soil that is in satisfactory condition. In other words, detrimental impacts (including compaction, displacement, rutting, severe burning, surface erosion, and mass wasting) shall be less than 15% of an activity area. In areas where more than 15% detrimental soil conditions exist from prior activities, the cumulative detrimental effects from proposed activities, including restoration, shall not exceed the conditions prior to the proposed activity and should move toward a net improvement in soil quality. Project design criteria would ensure that soil quality standards are met.

Appendix C describes in detail a site-specific, nonsignificant Forest Plan amendment adopting Region 1 soils standards that would be included in all action alternatives in the DEIS. The following amendment to Nez Perce Forest Plan Soil Quality Standard #2, specific to the Clear Creek project area, is proposed: Where detrimental soil conditions from past activities affect 15 percent or less of the activity area, a cumulative minimum of 85 percent of the activity area shall not be detrimentally compacted, displaced, or puddle upon completion of activities. Where detrimental soil conditions from past activities affect more than 15 percent of the activity area, the cumulative DSD from project implementation and past activities shall not exceed the conditions prior to the planned activity and shall provide a net improvement in soil quality."

1.13 THE NATIONAL FIRE PLAN AND THE HEALTHY FOREST RESTORATION ACT

The National Fire Plan (NFP) was developed in August 2000 following a landmark wildfire season with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capabilities. The NFP addresses 5 key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. With regard to jurisdiction, direction in the NFP allows for the Forest Service to take NFP action on NFS lands, and for States to take and coordinate action on State and private lands. The Healthy Forests Restoration Act of 2003 (HFRA) (P.L. 108-148) contains a variety of provisions to address hazardous fuel reduction and forest restoration projects on specific types of federal lands that are at risk of wildland fire and/or insect and disease epidemics. The HFRA helps all landowners and managers restore healthy forest and rangeland conditions on those lands, regardless of ownership.

Both the NFP and HFRA provide overarching direction to reduce the threat of wildfire and restore ecosystems. Management actions proposed within the Project area are designed to be consistent with this direction. Particularly, proposed management activities would trend the general landscape condition toward desired fuel profiles and would optimize opportunities to treat hazardous fuels in identified Wildland-Urban Interface (WUI) lands and across the project area landscape.

1.14 ENDANGERED SPECIES ACT

FSM 2670 directs the Forest Service to conserve endangered and threatened species and to utilize its authorities in furtherance of the Endangered Species Act (ESA), and to avoid actions that may cause a species to become threatened or endangered. FSM 2670 also requires the Forest Service to maintain viable populations of all native and desirable non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands. As directed by the ESA, biological assessments and consultation under section 7 of the ESA will be completed for this decision. The action alternatives are not expected to result in a jeopardy biological opinion for any listed species.

1.15 EXECUTIVE ORDERS 11988 AND 11990

These federal Executive Orders (EOs) provide for the protection and management of floodplains and wetlands. Numerous floodplains and wetlands exist within the analysis area.

EO 11988 (Floodplain Management) requires federal agencies to evaluate the potential effects of actions it may take in a floodplain to avoid adversely impacting floodplains wherever possible, to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management, including restoring and preserving such land areas as natural undeveloped floodplains, and to prescribe procedures to implement the policies and procedures of this EO.

EO 11990 (Protection of Wetlands) requires Federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this EO. Clear Creek Integrated Restoration project activities have been designed to be consistent with the requirements of EO 11988 and EO 11990.

1.16 EXECUTIVE ORDER 12898

EO 12898 (Environmental Justice) directs each federal agency to make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. An associated memorandum emphasizes the need to consider these types of effects during NEPA analysis. The Proposed Action and alternatives would not disproportionately adversely affect minority or low-income populations, including American Indian tribal members.

1.17 EXECUTIVE ORDER 13112

EO 13112 (Invasive Species) was issued on February 3, 1999, to enhance federal coordination and response to the complex and accelerating problem of invasive species. EO 13112 directs federal agencies to work together [as stated in the Preamble] to "…prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause." Project activities have been designed to be consistent with the requirements of EO 13112.

1.18 IDAHO FOREST PRACTICES ACT

The Idaho Forest Practices Act regulates forest practices on all land ownership in Idaho. Forest practices on NFS lands must adhere to the rules pertaining to water quality (IDAPA 20.02.01). The rules are also incorporated as BMPs in the Idaho Water Quality Standards. Project activities have been designed to be consistent with the Idaho Forest Practices Act.

1.19 IDAHO ROADLESS RULE

The Idaho Roadless Rule, promulgated on October 16, 2008 (73 FR 61456), identified a system of lands called "Idaho Roadless Areas" and established 5 management themes. These 5 themes protect roadless areas and their important characteristics by assigning various permissions and prohibitions regarding road building, timber cutting, and discretionary mineral activities. The final Rule also allows the Forest Service to reduce the risk of wildland fires to at-risk communities and municipal water supply systems. The final Rule supersedes the 2001 Roadless Area Conservation Rule for NFS lands in the State of Idaho. Project activities have been designed to be consistent with the Idaho Roadless Rule. The State of Idaho, Idaho Roadless Commission reviewed the Clear Creek Integrated Restoration Project's proposed activities on March 14, 2013.

1.20 IDAHO STREAM CHANNEL PROTECTION ACT

The Idaho Stream Channel Protection Act regulates stream channel alterations between mean and high water marks on perennial streams in Idaho (IDAPA 37.03.07). Instream activities on NFS lands must adhere to the rules pertaining to the Act. The rules are also incorporated as BMPs in the Idaho Water Quality Standards. Project activities have been designed to be consistent with the Idaho Stream Channel Protection Act.

1.21 NATIONAL ENVIRONMENTAL POLICY ACT, SECTIONS 101 AND 106

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) was signed into law on January 1, 1970. NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies. NEPA also established the CEQ.

Title I of NEPA contains a Declaration of National Environmental Policy that requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony. Section 102 requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment. These statements are commonly referred to as Environmental Impact Statements (EISs).

The public has an important role in the NEPA process, particularly during scoping, to provide input on what issues should be addressed in an EIS and to comment on the findings in an agency's NEPA documents. The public can participate in the NEPA process by attending NEPA-related hearings or public meetings and by submitting comments directly to the lead agency. The lead agency must consider all comments received from the public and other parties on NEPA documents during the comment period.

1.22 NATIONAL FOREST MANAGEMENT ACT

The National Forest Management Act (NFMA) (16 U.S.C. 1600–1614, August 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, and 1990) reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on NFS lands. NFMA requires the Secretary of Agriculture to assess forest lands; develop a management program based on multiple-use, sustained-yield principles; and implement a resource management plan for each unit of the NFS. It is the primary statute governing the administration of national forests. Project activities have been designed to be consistent with the NFMA.

1.23 NATIONAL HISTORIC PRESERVATION ACT

Section 101 of the National Environmental Policy Act requires federal agencies to preserve important historic, cultural, and natural aspects of our national heritage. The legal processes associated with the protection and preservation of these resources is

outlined in the National Historic Preservation Act of 1966 (NHPA) (36 CFR 800) and subsequent amendments. Passed by Congress two years before NEPA, the NHPA sets forth a framework for determining if a project is an "undertaking" that has the potential to effect cultural resources. The implementing regulations also outline the processes for identifying, evaluating, assessing effects, and protecting such properties. The coordination or linkage between the Section 106 process of the NHPA and the mandate to preserve our national heritage under NEPA is well understood and is formally established in 36 CFR 800.3b and 800.8. The terminology of "…important historic, cultural, and natural aspects of our national heritage" found in NEPA includes those resources defined as "historic properties" under the NHPA (36 CFR 800.16(l)(1)). It is thus the Section 106 process that agencies utilize to consider, manage, and protect historic properties during the planning and implementing stages of federal projects. The Forest meets its responsibilities under NHPA through compliance with the terms of a Programmatic Agreement (PA) signed between Region 1, the Idaho State Historic Preservation Office, and the Advisory Council on Historic Preservation.

1.24 TRIBAL TREATY RIGHTS

American Indian tribes are afforded special rights under various federal statutes: NHPA; NFMA; Archaeological Resources Protection Act of 1979 (ARPA) (43 CFR Part 7); Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (43 CFR Part 10); Religious Freedom Restoration Act of 1993 (P.L. 103141); and the American Indian Religious Freedom Act of 1978 (AIRFA). Federal guidelines direct federal agencies to consult with tribal representatives who may have concerns about federal actions that may affect religious practices, other traditional cultural uses, or cultural resource sites and remains associated with tribal ancestors. Any tribe whose aboriginal territory occurs within a project area is afforded the opportunity to voice concerns for issues governed by NHPA, NAGPRA, or AIRFA.

Federal responsibilities to consult with tribes are included in the NFMA; Interior Secretarial Order 3175 of 1993; and EOs 12875, 13007, 12866, and 13084. EO 12875 (Enhancing the Intergovernmental Partnership) calls for regular consultation with tribal governments. EO 13007 (Indian Sacred Sites) requires consultation with tribes and religious representatives on the access, use, and protection of sacred sites. EO 12866 (Regulatory Planning and Review) requires that federal agencies seek views of tribal officials before imposing regulatory requirements that might affect them. EO 13084 (Consultation and Coordination with Indian Tribal Governments) provides direction regarding consultation and coordination with tribes relative to fee waivers. EO 12898 (Environmental Justice) directs federal agencies to focus on the human health and environmental conditions in minority and low-income communities, especially in instances where decisions may adversely impact these populations (see "Executive Order 12898" above). NEPA regulations (40 CFR 1500–1508) invite tribes to participate in forest management projects and activities that may affect them.

Portions of the Forest are located within ceded lands of the Nez Perce Tribe. Ceded lands are federal lands on which the federal government recognizes that a tribe has certain inherent rights conferred by treaty. In Article 3 of the Nez Perce Treaty of 1855,

the United States of America and the Nez Perce Tribe mutually agreed that the Nez Perce retain the following rights:

> …taking fish at all usual and accustomed places in common with citizens of the Territory [of Idaho]; and of creating temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing horses and cattle…

The Clear Creek Integrated Restoration project has been presented to the Nez Perce Tribe at quarterly staff-to-staff meetings since April 2012.

Chapter 2–Alternatives, Including the Proposed Action

2.1 INTRODUCTION

This chapter describes and compares the alternatives considered for the Clear Creek Integrated Restoration Project, including alternatives considered but eliminated from detailed study. Maps of each alternative considered are included in Appendix A. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for options available to the Responsible Official. Some of the information used to compare the alternatives is based on the design of each alternative (such as regenerating versus deferring stands that have root disease), and some of the information is based upon the environmental, social, and economic effects of implementing each alternative (such as building new temporary roads versus deferring treatment in inaccessible stands).

2.2 ALTERNATIVES CONSIDERED IN DETAIL

The Forest Service developed the No Action Alternative (Alternative A), the Proposed Action as modified in response to scoping comments (Alternative B), and two additional action alternatives (Alternatives C and D) in response to issues raised by the public.

2.2.1 Actions Common to All Action Alternatives

The following actions would be included in all of the action alternatives.

- 1,887 acres of precommercial thinning, 41 acres of grass restoration, and 1,371 acres of prescribed fire
- 119.8 miles of system road reconstruction (Appendix B)
- 13.2 miles of system road decommissioning (Appendix B)
- A site-specific nonsignificant Forest Plan amendment adopting the Region 1 soil standard of 15% for detrimentally compacted, displaced, or puddled soils (Appendix C)
- A site-specific, nonsignificant Forest Plan amendment clarifying the Forest's interpretation of Appendix N of the Nez Perce Forest Plan (Appendix D).
- The Design Criteria described later in this chapter

2.2.2 Alternative A: No Action

Under the No Action alternative, current management plans would continue to guide management of the project area. No timber harvest, improvement cutting, temporary road construction, prescribed burning, grass restoration, road reconstruction, or road decommissioning would be implemented to accomplish project goals.

2.2.3 Alternative B: Proposed Action (As Modified In Response to Scoping Comments)

This alternative was developed in response to comments about the Proposed Action that was presented for public scoping in January 2012 (see Chapter 1 for a detailed

description of the Proposed Action that was used for scoping). Alternative B would move the project area toward the desired conditions identified for the project during the pre-NEPA phase.

During the pre-NEPA phase of project development, the IDT identified large polygons or patches within the Project area referred to as "Focus Areas." The Focus Areas were identified based on a need to promote similar age classes by connecting recently regenerated stands (preferably those regenerated within the last 20 years). The intent was to establish breaks in continuous fuels, favor areas with known or developing forest health issues, and target over-represented mid-seral and mature age classes. The IDT also attempted to bound these areas with identifiable features, such as forest type breaks, topographic breaks, and administrative boundaries. The Focus Areas served as the basis for developing the proposed action. A new Focus Area, developed after the Proposed Action was presented for scoping, was added to all of the action alternatives. It includes about 420 acres of regeneration harvest and some commercial and precommercial thin units. This new Focus Area also includes 1.2 miles of temporary roads, some of which would be on existing templates.

Within the Focus Areas, stands identified for regeneration would be regenerated to improve patch sizes, increase the amount of early seral forest across the landscape, and allow replanting with a mix of species that would improve the long-term resilience of these stands. Healthy grand fir/Douglas-fir, ponderosa pine, and other early seral stands would be commercially thinned. If root disease were detected in younger Douglas-fir/grand fir stands proposed for commercial thinning, treatment of these stands would be **deferred**.

Outside of the Focus Areas, healthy grand fir/Douglas-fir, ponderosa pine, and other early seral stands would be commercially thinned. If root disease were detected in younger Douglas-fir/grand fir stands proposed for commercial thinning, treatment of these stands would be **deferred**.

All prescribed fire treatments would occur within the Clear Creek Roadless Area.

Table 2-1 summarizes the activities to be undertaken under Alternative B, and Appendix A contains a map of the proposed activities.

Table 2-1. Alternative B Vegetation Treatment and Temporary Road Construction

Treatment	Amount
Precommercial thinning (acres)	1,887
Grass restoration (acres)	41
Prescribed fire (acres)	1,371
Regeneration, Including Site Preparation and Reforestation (acres)	2,609
Improvement (acres)	331
Commercial Thin (acres)	5,606
Road reconstruction (miles)	119.8
Temporary Roads on Existing Templates (miles)	8.7
Temporary Roads, New Construction (miles)	27.6
Road decommissioning (miles)	13.2

2.2.4 Alternative C: Maximal Species Conversion

This alternative would address vegetative restoration needs described in the purpose and need for action, but to a greater degree than Alternative B. Desired conditions developed for this project indicate that young forest, particularly the 0–10 year age class, is well below desired conditions. Alternative C would move the project area toward the desired conditions by regenerating as many stands as possible, while still meeting objectives for other resources. This alternative was developed in response to scoping comments about the following resource concerns:

- Patch size and fragmentation
- Improvement of the distribution of hiding cover relative to foraging habitat
- Increase in the amount of early successional stands and wildlife foraging habitats
- Forest structure
- Economics
- Increase in stand mortality, by spreading root disease by commercially thinning stands infected
- Increase distribution of early seral species across the landscape

Alternative C would include 3,742 acres of commercial thin outside of the original Focus Areas.

Within the Focus Areas, stands identified for regeneration would be regenerated to improve patch sizes, increase the amount of early seral forest across the landscape, and allow replanting with a mix of species that would improve the long-term resilience of these stands. Stands proposed for commercial thinning that are not comprised of early seral species would be **regenerated**. Forest Service Handbook (FSH) 2409.17 allows the Forest Service to regenerate young stands based on specific ecological, resource, and management criteria to meet the purpose and need of a specific project.

Outside of the Focus Areas, healthy grand fir/Douglas-fir, pine, and other early seral stands would be commercially thinned. If root disease were detected in younger Douglas-fir/grand fir stands proposed for commercial thinning, treatment of these stands would be **deferred**.

Table 2-2 summarizes the activities to be undertaken under Alternative C, and Appendix A contains a map that displays the proposed activities.

Table 2-2. Alternative C Vegetation Treatment and Temporary Road Construction

Treatment	Amount
Precommercial thinning (acres)	1,887
Grass restoration (acres)	41
Prescribed fire (acres)	1,371
Regeneration, Including Site Preparation and Reforestation (acres)	4,156
Improvement (acres)	331
Commercial Thin (acres)	4,220
Road reconstruction (miles)	119.8
Temporary Roads on Existing Templates (miles)	8.7
Temporary Roads, New Construction (miles)	27.6
Road decommissioning (miles)	13.2

2.2.5 Alternative D: Minimal Temporary Road Construction

Alternative D would address the need for vegetative rehabilitation in the Clear Creek watershed, but to a lesser degree than Alternative B. This alternative would use existing road templates as much as possible. It was developed in response to scoping comments about the following resource concerns:

- Road densities/cumulative impacts of past management
- Sediment input to stream channels
- Cumulative impacts of past timber harvest and road building on fisheries habitat, water quality, and soil productivity
- Effects of the road network on elk security habitat
- Meeting desired conditions for watersheds, fish, and wildlife habitats

A total of 8.7 miles of previously decommissioned roads that have existing templates (were not physically obliterated) would be reopened and 8.8 miles of new temporary roads would be constructed. Existing road templates were identified through photo interpretation, including aerial photos from 1970 and subsequent years, the LIDAR layer, and field reviews. The average length of new temporary road construction would be 375 feet; the average length of the existing template is 820 feet. New temporary construction would be added to the existing templates.

Units would be harvested as described for Alternative B, except that some units would be dropped if they were not accessible by the more limited road system proposed for Alternative D.

Table 2-3 summarizes the activities to be undertaken under Alternative D, and Appendix A contains a map that displays the proposed activities.

Table 2-3. Alternative D Vegetation Treatment and Temporary Road Construction

Treatment	Amount
Precommercial thinning (acres)	1,887
Grass restoration (acres)	41
Prescribed fire (acres)	1,371
Regeneration, Including Site Preparation and Reforestation (acres)	2,178
Improvement (acres)	211
Commercial Thin (acres)	5,141
Road reconstruction (miles)	119.8
Temporary Roads on Existing Templates (miles)	8.7
Temporary Roads, New Construction (miles)	8.8
Road decommissioning (miles)	13.2

2.2.6 Design Criteria

The following design criteria would be included as actions common to all action alternatives.

2.2.6.1 Soils

Effectiveness of design features are moderate to high based on past monitoring and research (Froehlich and McNabb 1983; Graham et al. 1994; Graham et al. 1999; Korb 2004; Neary et al. 2008; Curran et al. 2005a,b).

1) When machine piling, existing duff/litter would be retained (as much as possible and not included in the activity slash piling.
2) Skid trails, landings, and yarding corridors would be located and designated to minimize the area of increased detrimental soil effects. This would not preclude the use of feller bunchers off skid trails if soil impacts can remain within standards.
3) Approximately 250 acres of landslide prone areas have been mapped and field verified in the harvest units. These landslide prone areas would be further delineated in the field during unit layout and would receive a PACFISH buffer. No harvest activities would occur in these areas.
4) Landslide prone areas in prescribed fire units would receive a PACFISH buffer. No ignition would occur in these areas, although fire would be allowed to back through.
5) For units with high subsurface erosion potential, the amount of excavated skid trails and landings would be limited to the extent possible, and all excavated skid trails and landings on these landtypes would be decommissioned (full recontour) and large woody material would be placed over the slope for soil stabilization.
6) For Units designated in the reuse, trending positive, and Forest Plan amendment design categories (see section 3.6.5): A logging system layout design would be developed to use as many of the existing skid trails and landings as possible and limit the amount of new detrimental disturbance and all skid trails and landings used would be decommissioned after use. Actions would include

scarifying/decompacting soils and placement of slash, woody material, and/or duff over exposed soil. Equipment used for machine piling or mastication of activity slash would remain on designated skid trail or would be required to rehabilitate (decompact or recontour) any detrimental disturbance they cause.

7) For Units designated in the special design category (see section 3.6.5), special attention would be needed for these units to remain at or below 15% Detrimental Soil Disturbance (DSD) following project implementation. Methods to ensure this might include locating main skid trails only on existing disturbed areas, with few "one-pass" trails occurring on undisturbed ground; using a cut-to-length forwarder system; requiring equipment used for machine piling or mastication of activity slash to remain on designated skid trails; and developing a logging system layout design that limits the amount of new detrimental disturbance. Portions of the unit could be dropped if the layout plan cannot reach the entire unit while staying under the 15% standard. The estimated amount of acres of new disturbance has been calculated for each unit and can be found in the project file. In addition, all skid trails and landings and temporary roads (see item 10 for temporary road decommissioning) would be decommissioned.
8) For all harvest units, decompaction would be required on skid trails where excavation or ground disturbance has occurred or where successive passes have taken place over the same trail. Decompaction would be conducted to improve soil productivity and meet Regional soil quality standards. Decompaction would span the width of the compacted areas and extend to a depth of 10–18 inches, to effectively loosen the ground to allow water penetration and revegetation and to prevent the rocky sub-surface soils from mixing with the topsoil. The depth of decompaction should be adjusted to avoid turning up large rocks, roots, or stumps. Equipment would not be permitted to operate outside the clearing limits of the skid trail. Decompaction should be done during from June 15 to October 15, unless otherwise approved. No decompaction work should be done during wet weather or when the ground is frozen or otherwise unsuitable. All erosion control barriers and cross ditches removed or otherwise rendered ineffective by the decompaction treatment should be reinstalled as they were prior to the decompaction.
9) In all units, to reduce ground disturbance, no ground based skidding would be allowed on slopes over 35%, unless mitigating measures, such as operating on adequate compacted snow or only over short distances, are approved by the soil specialist.
10) All temporary roads would be scarified and decommissioned (all new construction would be recontoured; existing prisms would be placed in a stable condition through recontouring and/or decompaction). Cut/fill slopes and crossings would be reshaped to natural contours. Available slash would be applied to the recontour surface (slash is considered "available" where the equipment can reach it from the working area where the decommissioning is occurring).
11) Activities would be restricted when soils are wet to prevent resource damage (indicators include excessive rutting, soil displacement, and erosion).

12) For all harvest units, coarse woody material appropriate to the site would be retained for nutrient cycling, maintaining soil moisture, soil stability, and other soil physical and biological properties after all unit activities. Regional guidance for organic matter recommends the following guidelines, such as retaining coarse (> 3 inches diameter) woody material to maintain soil productivity (Graham et al. 1994). Drier habitat types have wood retention requirements of 7–15 tons/acre for Douglas-fir, grand fir, and ponderosa pine types. Moister habitat types require 17–33 tons/acre. Approximately 14–28 standing trees would be retained for future down wood recruitment. Snags or other designated retention trees felled for safety reasons would be left in the unit.
13) Burning of activity generated slash would be designed in the project burn plan to provide a low-severity mosaic burn with little-to-no detrimental disturbance of soil resources (Neary et al. 2008). Slash would be allowed to overwinter prior to burning. This does not include whole tree yarding.

2.2.6.2 Wildlife

1) All temporary roads would be closed to the public and decommissioned following use.
2) All existing access restrictions and a vegetative screen (1 site potential tree height) of shrubs and sapling and pole size trees where they exist would be maintained along open motorized roads to help maintain elk habitat quality and reduce hunting season vulnerability.
3) Verified old growth would be designated MA 20 and all MA 20 would be full retention.
4) Old growth would be treated with improvement harvest. The stands proposed for improvement harvest contain some exceptionally large ponderosa pine and other large old trees in a mosaic of young trees that likely developed from fire exclusion. Fuels in these areas have increased due to encroachment of grand fir forming ladder fuels and fuel accumulation on the ground associated with ongoing mortality from insects and disease and fire suppression. The treatments would be designed to maintain and improve resiliency of specific trees with a combination of commercial and non-commercial activities. Improvement harvest in old growth would not change old-growth status per Green et al (1992 as amended) old growth criteria. This "fully maintains, or contributes toward the restoration of, the structure and composition of old growth stands…" per PL 111-11 Title IV (2009).
5) Using standard contract provisions C2.3 and C6.32, large snags would be retained. Each post-treated area, on average, would comply with mean snag retention values displayed in Table 12 of *Estimates of Snag Densities for Northern Idaho Forests in the Northern Region*, (Bollenbacher et al. 2009) for low and mid elevation moist habitat types in early seral conditions (at least 3 snags per acre greater than 15 inches diameter at breast height [dbh] and at least 3 snags per acre greater than 21 inches dbh). Preferred species (ponderosa pine, western larch, Douglas-fir) of large, legacy snags would be selected for retention. Alternate tree species would be retained where preferred species do not exist in

quantities to meet Regional guidance. Large snags would be retained with green trees in groups of 7–10 trees or larger retention patches. Preference would be given to the largest available snags or damaged trees, generally greater than 21 inches in diameter and greater than 40 feet tall. A combination of clumps (groups of live and dead trees) and lone snags that have little potential to cause safety issues would be retained. Avoid snag retention near log landings and firelines and within 100 feet below and 200 feet above open motorized roads. Snag or live retention trees felled for safety purposes would be left on site or traded with a comparable tree.

6) In treatment areas, all legacy trees (large diameter trees that survived the last stand replacing event) would be retained. In Clear Creek, these trees frequently are over 30 inches dbh. Legacy trees may be unevenly distributed and retained in clumps as well as individual trees. This design measure allows hazardous fuels reduction while "…maximizing the retention of large trees, as appropriate for the forest type…" per PL 111-11 Title IV (2009).
7) Green tree retention in all regeneration and improvement harvest areas would consist of an average of 14–28 of the largest trees per acre (generally over 21 inches dbh) distributed in clumps (7–10+ trees plus snags) and individuals, with no area greater than 2 acres without retained trees. Tree retention would focus on ponderosa pine, western larch, and healthy Douglas-fir, and large tree retention would be maximized, as appropriate for the forest type per PL 111-11 Title IV (2009).
8) *Regeneration Harvest Leave Tree Survival:* The Clear Creek project would strive for a variable tree survival objective for the project as a whole, with the objective of having almost all legacy trees (large diameter trees that survived the last stand replacing fire) survive the prescribed burns. Fuel reduction measures (limb/top removal or slash reduction around these trees) would be implemented where needed to insure tree survival for the legacy larch, ponderosa pine and Douglas-fir. For the non-legacy trees, the objective would be for a majority (>50%) of the leave trees to survive the prescribed burn. Prescribed fire might be allowed to back into RHCAs and retained clumps; however, no ignitions would be allowed within them. This objective could be accomplished through the use of appropriate ignition patterns, ignition rates, fuel moisture, and burn timing without any extra fuel reduction measures; however, that evaluation would be made following the project layout. These measures allow hazardous fuel reduction while "…maximizing the retention of large trees, as appropriate for the forest type…" per PL 111-11 Title IV (2009).
9) Using standard contract provision C6.24 (Wildlife and Botanical Protection Measures), maintain a minimum 40-acre yearlong no-treatment buffer around occupied goshawk nest trees. No ground disturbing activities would be allowed inside occupied post-fledgling goshawk areas (300–600 acres around the nest stand) from April 15 to August 15 (R1-C6.316).
10) If a den, nest sites, or other important habitat feature of any threatened, endangered, or SS were to be discovered within or in close proximity to any

treatment unit, project activities would be coordinated with a wildlife biologist so that appropriate conservation measures could be developed.

11) The spread of noxious weeds and invasive plants would be minimized by chemically treating any noxious weed populations along the existing road systems before and after project implementation (C6.27); monitoring and cleaning any equipment of loose debris prior entering the Project area to prevent "new invader" weed establishment (C6.351/C6.27); and revegetating project-related exposed soils (i.e. landings, skid trails, road sides, etc.) using certified noxious weed free native seed mix and fertilizer (as necessary) upon project completion. All seeding would follow Region 1 guidelines.

12) In moose winter range (MA 21), silvicultural prescriptions that comply with Forest Plan standards would be developed for commercial thin and regeneration harvest areas and incorporated into marking or layout guidelines. The following commercial thin units occur in MA 21: 228, 230, 231, 234, 238, 335, 349–351, and 356–358. The following regeneration harvest units occur in MA 21: 136–139, 145, and 146.

13) Retained large down logs would be evenly distributed in regeneration and improvement units. On average, harvested areas would have 5 pieces per acre 15–20 inches dbh and 30 feet long and 2 pieces per acre >20 inches dbh and 30 feet long.

14) Landscape burning prescriptions, especially in MA 16 (winter range), would be developed to maintain the duff layer to prevent invasive species germination. Burn units 701–715 occur in MA 16.

15) When compatible with established fish/water quality objectives and economics, units at the far end of roads would be cut first (Forest Plan Standard #11 page II-19).

2.2.6.3 Aquatics

1) PACFISH default buffers would be used to define timber sale unit boundaries. No timber harvest would occur within 300 feet of fish-bearing streams, 150 feet of perennial non-fish bearing water, 100 feet of intermittent streams, and 150-foot slope distance from the edge of wetlands larger than one acre. Ignition points for prescribed fire would be located outside of the PACFISH riparian buffers.

2) Prescribed fire would not be ignited in areas requiring 100 percent live canopy retention. The burn objective would be to prevent fire entry into these areas. Low-intensity fire may be allowed to back into the edges of some of these sensitive areas and would result in no less than 90% live-canopy retention for the area.

3) BMSs as found in Rules Pertaining to the Idaho Forest Practices Act Title 38, Chapter 13, Idaho Code, and Soil and Water Conservation Practices (SWCP) Handbook, FSH 2509.22 would be applied to prevent non-channelized sediment delivery from harvest units to streams in the Project area.

4) Standard contract provision B6.341 would be applied throughout project implementation to minimize the risk of an accidental spill of petroleum products, as well as to protect water courses and aquatic biota from adverse effects in the event of a spill.
5) During road decommissioning or culvert replacements, measures to prevent damaging levels of sediment from entering streams would be undertaken, such as: (a) placing removable sediment traps below work areas to trap fines; (b) when working instream, removing all fill around pipes prior to bypass and pipe removal (where this is not possible, use non-eroding diversion); (c) revegetating scarified and disturbed soils with weed-free grasses for short-term erosion protection and with shrubs and trees for long-term soil stability; (d) utilizing erosion control mats on stream channel slopes and slides; (e) mulching with native materials, where available, or using weed-free straw to ensure coverage of exposed soils; (f) dissipating energy in the newly constructed stream channels using log or rock weirs; and (g) armoring channel banks and dissipating energy with large rock whenever possible.

2.2.6.4 Heritage Resources

Table 2-4 describes mitigation measures/design criteria that would be implemented to protect Heritage Resources in the project area.

Table 2-4. Mitigation measures and design criteria that would be implemented to protect heritage resources in the Clear Creek project area

Site Number/Type[a]	Unit Number	Alternative C Harvest Method	Mitigation
10IH487 / Lithic Scatter	309	Commercial Thin	Avoid
10IH883 / Trail	230 354	Regeneration Commercial Thin	50 foot buffer 50 foot buffer
10IH1746 / Lithic Scatter	309	Commercial Thin	Avoid
10IH2164 / Lithic Scatter	307	Commercial Thin	Avoid
10IH3197 / Trail	301 306 307 316 318 319 373	Commercial Thin Commercial Thin Commercial Thin Commercial Thin Commercial Thin Commercial Thin Commercial Thin	50 foot buffer 50 foot buffer 50 foot buffer 50 foot buffer 50 foot buffer 50 foot buffer 50 foot buffer

[a] Site locations are protected by law (36 CFR 296.18), but will be communicated to project personnel to insure protection.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives would have modified the proposed action to the point where the purpose and need for action would

not be met, would have been duplicative of the alternatives considered in detail, or were determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below. See the "Issues" section in Chapter 1 for a more detailed discussion of the alternative-driving issues that were raised during scoping.

Old Growth: The IDT considered an alternative that would harvest old growth stands, but did not study it in detail, although improvement cuts would be done in some old growth stands to help keep them on the landscape longer. Although the amount of old growth in the project area exceeds the Forest Plan minimum standard, CFLRA goals and objectives require that large diameter trees be retained as much as possible. Appendix D describes a site-specific Forest Plan amendment clarifying how Forest Plan standards for old growth would be interpreted for this project.

Watershed Rehabilitation (Road Decommissioning) Only; No Timber Harvest or Prescribed Burning: Some commenters asked that the IDT consider an alternative that would focus only on watershed rehabilitation activities, such as road decommissioning, with no timber harvest or prescribed burning.

The IDT analyzed this alternative, but did not study it in detail because it would not meet the purpose and need for this project. Also, in effect, this "alternative" was previously analyzed in the South Fork–West Fork Clear Creek Road Decommissioning Environmental Assessment (USDA Forest Service 2011), which decommissioned 85 miles of roads in the Clear Creek watershed. An additional 13.2 miles of NFS road decommissioning are proposed for the Clear Creek Integrated Restoration Project as actions common to all alternatives.

Prescribed Burning-Only Alternative: The IDT analyzed an alternative that would use prescribed burning alone to manage vegetation, but did not study it in detail because it would not meet the purpose and need for this project, and because of economic concerns. Timber outputs from the proposed action would be used to offset treatment costs and support the economic structure of local communities and provide for regional and national needs. Also, burning commercial timber would not be consistent with the Forest Plan.

No Prescribed Burning: Some commenters asked that the IDT develop an alternative that would not include any prescribed burning.

The IDT analyzed this alternative, but did not study it in detail because prescribed burning is the only viable tool available to manage vegetation within the Clear Creek Roadless Area.

Prescribed fire is also an important and effective tool for reducing post activity fuels in treatment units as well as stimulating grass, forb and shrub re-growth.

No Temporary Road Construction/Use Existing Roads Only/Helicopter Logging: Some commenters were concerned about existing road densities in the Clear Creek watershed and the effects of the road system on fisheries and wildlife habitat.

An alternative that would not build any temporary roads was considered but not analyzed in detail by the IDT because it would reduce the managed area to the point where the purpose and need to manage vegetation would not be met. The road system in the Clear Creek watershed has already been substantially reduced. The South Fork–West Fork Clear Creek Road Decommissioning DN/FONSI (2011) decommissioned 85 miles of roads. Temporary roads constructed for the Clear Creek Integrated Restoration Project would be decommissioned and recontoured after use.

Watershed rehabilitation is better achieved by decommissioning old roads in poor locations and building new temporary roads in better locations, then recontouring them after use, than by reconstructing old roads in poor locations.

The IDT considered an alternative that would build temporary roads only on existing or former road templates. This alternative was not analyzed in detail because it would not provide enough access or access in the appropriate locations to meet the purpose and need to manage vegetation in the project area.

The IDT also considered an alternative that would use helicopter logging instead of building temporary roads. This alternative was not analyzed in detail because a timber sale based on helicopter logging alone would not be economically viable. Also, conducting follow-up management activities, such as site preparation and planting, would be very expensive.

Do Not Use Vegetation Response Unit Desired Future Conditions Developed for this Project: Some commenters did not want the DFCs that were developed specifically for this Project to be used and asked that the IDT use Forest Plan goals and objectives alone to guide management activities.

The IDT considered this alternative, but did not analyze it in detail because project-specific desired conditions that were developed during the pre-NEPA stage of project were based on Forest Plan direction and refined by the best available science. Site-specific, VRU-based desired conditions that were based on Forest Plan goals, objectives, and standards, were used to develop the alternatives analyzed in detail.

2.4 COMPARISON OF ALTERNATIVES

This section provides a summary of the effects of implementing each alternative. Information in the Table 2-5 is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Table 2-6 compares the alternatives by resource indicators and compares the alternatives by issue and resource indicators.

Table 2-5. Comparison of Alternatives by Activity

Activity	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D	Comments
Regeneration Harvest Acres Within Focus Areas	0	2,609	3,995	2,017	
Regeneration Harvest Acres Outside of Focus Areas	0	0	161	161	
Total Regeneration Harvest Acres	**0**	**2,609**	**4,156**	**2,178**	
Commercial Thin Acres Within Focus Areas	0	2,240	854	1,997	
Commercial Thin Acres Outside of Focus Areas	0	3,366	3,366	3,144	
Total Commercial Thin Acres	**0**	**5,606**	**4,220**	**5,141**	
Precommercial Thin Acres Within Focus Areas	0	998	998	998	
Precommercial Thin Acres Outside of Focus Areas	0	889	889	889	
Total Precommercial Thin Acres	**0**	**1,887**	**1,887**	**1,887**	
Improvement Harvest Acres	0	331	331	211	
Restoration (Grass)	0	41	41	41	
Prescribed Fire Acres	0	1,371	1,371	1,371	
System Road Construction (miles)	0	0	0	0	
System Road Reconstruction (miles)	0	119.8	119.8	119.8	If reconstruction is proposed for any part of a road, the total mileage of the road is included.
System Road Reconditioning (miles)	0	48.8	48.8	48.8	
Temporary Roads—Existing Template (miles)	0	8.7	8.7	8.7	
Temporary Roads—New Construction (miles)		27.6	27.6	8.8	No new temp roads over 600 ft
System Road Decommissioning (miles)	0	13.2	13.2	13.2	

Activity	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative D	Comments
Open Seasonally or Yearlong to Vehicles >50 inches wide (miles)	39.9	39.9	39.9	39.9	From DRAMVU Alt. 5
Open Seasonally or Yearlong to <50-inch motorized vehicles (miles)	26.1	26.1	26.1	26.1	From DRAMVU Alt. 5
Open Seasonally to Motorcycles (miles)	8.2	8.2	8.2	8.2	From DRAMVU Alt. 5
Forest Plan Amendment	0	1	1	1	Soils
Forest Plan Amendment	0	1	1	1	Old Growth
Site Preparation and Reforestation	0	2,609	3,995	2,017	Mechanical site prept for ground-based harvest; prescribed fire site prep for skyline harvest.

Table 2-6. Comparison of alternatives by activity

Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Purpose and Need 1: Vegetation and Wildlife Habitat Improvement				
Forest structure consists of a range of age and size classes with species diversity that is resistant and resilient to change agents (insects, diseases, and wildfires)				
Early seral species represent a greater percentage of species mix?	No	Yes	Yes	Yes
Purpose and Need 2: Goods and Services				
Sustained yield of resources outputs provided?	No	Yes	Yes	Yes
Purpose and Need 3: Watershed Improvement				
Road system maintained to provide for timber harvest, recreation, fire suppression, and administrative use?	Yes	Yes	Yes	Yes

Table 2-7. Comparison of alternatives by issue and resource indicator

Issue and Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Aquatics/Fisheries Habitat				
RHCA Road Density	1.2 mi/mi^2	1.0 mi/mi^2	1.0 mi/mi^2	1.0 mi/mi^2
Number of undersized culverts replaced and cross drains added	0	77	77	77
FISHSED results for modeled changes in cobble embeddedness:				
Hoodoo Creek	33%	34% (+1%)	34% (+1%)	34% (+1%)
Solo Creek	31%	32% (+1%)	32% (+1%)	32% (+1%)
Pine Knob Creek	44%	45% (+1%)	45% (+1%)	45% (+1%)
Clear Creek	38%	39% (+1%)	38% (+0%)	38% (+0%)
Middle Fork Clear Creek	55%	56% (+1%)	56% (+1%)	56% (+0%)
Brown Springs Creek	30%	32% (+2%)	32% (+2%)	32% (+2%)
South Fork Clear Creek	11%	11% (+0%)	11% (+0%)	11% (+0%)
Kay Creek	18%	18% (+0%)	18% (+0%)	18% (+0%)

Issue and Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Economics				
Volume Harvested (CCF)	0	141,500 CCF	158,000 CCF	116,400 CCF
Volume Harvested (MBF)	0	75,300	85,200	61,800
Jobs Sustained	0	1,910 jobs	2,133 jobs	1,571 jobs
Community Harvest Income	0	$54,252,000	$60,578,000	$44,628,000
Federal Income Tax	0	$8,138,000	$9,087,000	$6,694,000
Sale Feasibility (Present Net Value)	0	$4,171,000	$2,113,000	$2,679,000
Fuels				
Percentage of Crown Fire Susceptible Landscape	51%	44%	44%	44%
Fire Regime Condition Class	FRCC2 (39%)	FRCC2 (38%)	FRCC2 (37%)	FRCC2 (38%)
Roadless Areas				
Effects to Wilderness Values:				
Natural Integrity	No effect	Beneficial Effect	Beneficial Effect	Beneficial Effect
Undeveloped Characteristics	No effect	Minimal Effect	Minimal Effect	Minimal Effect
Opportunities for Solitude or Primitive Unconfined Recreation	No effect	Temporarily Affected	Temporarily Affected	Temporarily Affected
Special Features and Values	No effect	No Effect	No Effect	No Effect
Manageability	No effect	No Effect	No Effect	No Effect
Soils				
Acres of ground based harvest activity on landtypes with high subsurface erosion hazard	0	3,080	3,080	2,950
Miles of temporary roads on landtypes with high subsurface erosion hazard	0	30 miles	30 miles	15 miles
Number of commercial harvest units requiring specialized design measures to meet Regional soil standards	0	77	78	75

Issue and Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Vegetation				
Percent Increase of Treatment Area with Forest Cover Type Dominated by Long-lived Early Seral Species	0	13.26/73.96 61	9.06/72.72 64	14.92/74.39 59
Percent Change of the Treatment Area in Each Stand Age Class				
Young (0-40 years)	0	68	57	64
Mid-seral (41-100 years)	0	-30	-35	-31
Mature (101-149 years)	0	-24	-14	-21
Old (150+ years)	0	-15	-9	-13
Dominant Vertical Structure Pattern Across Landscape	1 and 2 storied	1 and 2 storied	1 and 2 storied	1 and 2 storied
Patch Sizes of the Structural Classes (mean patch size in acres)				
Seral shrub	41	252	252	252
Stand initiation	17	96	104	91
Stem exclusion	13	131	119	128
Understory reinitiation	23	83	83	83
Young multi-story	20	26	904	26
Old single-story	20	116	121	116
Old multi-story	34	81	72	81

Issue and Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Wildlife				
Wildlife Species' Habitat Effect (acres treated in modeled potential habitat)				
American Marten	0	1229	1229	836
Black-backed Woodpecker	0	649	649	592
Fisher	0	3971	4014	2508
Flammulated Owl	0	327	349	257
Fringed Myotis	0	146	146	125
Long-eared Myotis	0	674	674	487
Long-legged Myotis	0	674	674	487
Mountain Quail	0	35	35	35
Pygmy Nuthatch	0	347	348	306
Northern Goshawk (Nesting)	0	298	298	290
Pileated Woodpecker (Nesting)	0	875	875	772
Ringneck Snake	0	493	493	389
Western Toad Uplands	0	59	55	63
Elk Winter Range (acres treated in MA 16)	0	4380	4502	3809
Elk Summer Range (# of Elk Analysis Areas meeting Forest Plan Standards)	7	7	7	7
Elk Security- number of elk analysis areas meeting desired conditions (30%)	6	6	6	6
Canada Lynx				
Acres of Denning Habitat Treated	0	105	83	58
Acres of Foraging Habitat Treated	0	62	61	57
Consistent with the Northern Rockies Lynx Management Decision	Yes	Yes	Yes	Yes
Moose Winter Range (acres treated in MA 21)	0	776	776	630

Issue and Resource Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Watershed				
Percent increase in equivalent clearcut area (ECA)				
Upper Clear Creek	0	15%	15%	13%
South Fork Clear Creek	0	7%	7%	6%
Lower Clear Creek	0	8%	9%	7%
Percent Sediment Yield Increased Over Base (Natural) as Modeled By NEZSED				
Pine Knob Creek	1.2%	16%	16%	16%
Browns Spring Creek	2.0%	23%	24%	21%
Clear Creek	0.8%	7%	7%	5%
Solo Creek	1.5%	16%	16%	14%
Middle Fork Clear Creek	1.0%	8%	8%	5%
Kay Creek	1.5%	3%	3%	2%
South Fork Clear Creek	0.6%	5%	6%	4%
Hoodoo Creek	2.4%	20%	21%	17%
Watershed Road Density (mi/mi2)				
Pine Knob Creek	4.8	4.3	4.3	4.3
Browns Spring Creek	4.1	3.2	3.2	3.2
Clear Creek	2.3	2.3	2.3	2.3
Solo Creek	3.5	3.1	3.1	3.1
Middle Fork Clear Creek	2.4	2.2	2.2	2.2
Kay Creek	2.5	2.4	2.4	2.4
South Fork Clear Creek	1.6	1.6	1.6	1.6
Hoodoo Creek	3.8	3.8	3.8	3.8
Big Cedar Creek	4.6	4.4	4.4	4.4
Lower Clear Creek Face	1.8	1.8	1.8	1.8

Chapter 3–Environmental Consequences

This section summarizes the physical, biological, social, and economic environments of the project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of the alternatives presented in Table 2-5 through Table 2-7.

3.1 AQUATICS

This section summarizes the effects of the alternatives on the aquatic resource, which includes water quality and fisheries. The section was summarized from the "Clear Creek Restoration Aquatics Report," available in the project record.

3.1.1 Analysis Area

The project area is about 43,700 acres and encompasses the upper two-thirds of the Clear Creek drainage and all of its tributaries. Clear Creek flows into the Middle Fork Clearwater River. This analysis area was selected because it includes all Forest Service–managed lands—and all the streams therein—that could be affected by project activities.

3.1.2 Regulatory Framework

Nez Perce National Forest Plan (Forest Plan) direction and all federal and State laws and regulations applicable to watershed and fisheries resources would be applied to the project, including the Clean Water Act, the ESA, Idaho Water Quality Standards, and the Idaho Forest Practices Act.

Nez Perce National Forest Plan—Forest standards for water resources are found within the Forest Plan (USDA Forest Service 1987b, pages II-18 through II-22). The Forest Plan directs that forest management activities minimize sediment input to streams, meet beneficial uses, apply BMPs to ensure water quality standards are met or exceeded, and manage all water under the designated standards found in Forest Plan Appendix A. The project complies with this direction through the implementation of project design features and road improvement and decommissioning activities.

The Forest Plan was amended in 1995, following a joint decision (commonly called PACFISH) by the U.S. Forest Service and Bureau of Land Management (BLM) for managing anadromous fish-producing watersheds on federal lands, including streams within the project area. The standards and guides from PACFISH would be applied to the project.

The interim direction provided by PACFISH identifies and defines RHCAs, establishes RMOs, and applies standards and guidelines to meet the RMOs. PACFISH default RHCAs (buffers) include those areas within 300 feet of fish-bearing streams, within 150 feet of non-fish-bearing streams, and 100 feet on intermittent streams and wetlands of 1 acre or less. RHCA widths exceed state BMP standards. All management activities must be designed to cause no adverse effect to the designated RMOs, which dictate certain standards for large, instream woody material, stream temperature, width-to-depth ratios, bank stability, and pool frequency. The project would comply with PACFISH.

36 CFR 219.20—These regulations require projects to achieve the following objectives: conserve the soil and water resource; protect streams, streambanks, and wetlands; provide for adequate fish habitat; and give special attention to riparian areas in regard to topography, vegetation type, soils, climate, and management objectives.

Endangered Species Act— The U.S. Fish and Wildlife Service (USFWS) lists bull trout as threatened under the ESA (www.fws.gov Feb. 6 2013). Steelhead trout and fall chinook salmon are also listed as threatened (National Oceanic and Atmospheric Administration [NOAA] www.nwr.noaa.gov). Consultation with the USFWS and NOAA is required for projects affecting these species. The project would be designed to have no adverse effects on listed species.

Regional Forester Sensitive Species—Since the Forest Plan was published in 1987, the Regional Forester has approved an updated list for the Forest (June 2008). The list can be found at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5366363.pdf. This list includes 4 fish species: westslope cutthroat trout, interior redband trout, Snake River spring chinook salmon, and Pacific lamprey. The western pearlshell mussel was added in 2010. A Biological Evaluation is required to determine the effects of the project on these species. The project may impact individuals but would not lead to the listing of species under ESA.

Idaho Forest Practices Act—This act regulates forest practices on all land ownerships in Idaho. Forest practices on National Forest lands must adhere to the rules pertaining to the act (IDAPA 20.02.01). The rules are also incorporated as BMPs in Idaho's Water Quality Standards. The project would comply with the Idaho Forest Practices Act by implementing BMPs to protect and maintain water quality standards.

3.1.3 Analysis Methodology

3.1.3.1 Stream and Habitat Surveys

Past and recent stream survey data were used to determine if instream conditions meet Forest Plan direction. Field surveys were conducted between 2010 and 2012 to assess road and culvert conditions, as well as fish presence at road crossings. General stream conditions were also noted. The survey data were used to develop proposed project activities. Google Earth (and other photo imagery), in combination with field surveys, was used to assess vegetative cover over project area streams and the availability of future woody material to those streams. Geographic Information System (GIS) was used to assess a variety of information, including road and stream miles within the project area.

Habitat surveys on anadromous fish streams were conducted by the Nez Perce Tribe in 1984. Stream habitat and fish surveys were also conducted by the Forest for Middle Fork Clear Creek, Solo Creek, and Pine Knob Creek in 1993. Information collected included physical data (stream type, habitat types, substrate, woody material, and sediment levels) and biological data (fish species, distribution, and densities). Stream habitat surveys were also conducted in 2007 and 2010 in the mainstem, West Fork, and South Fork of Clear Creek and in Kay Creek as part of the PACFISH/INFISH Biological Opinion (PIBO) monitoring effort. Cobble embeddedness surveys were conducted by Forest personnel in 2012 to determine compliance with Forest Plan water quality objectives. The USFWS Dworshak Fisheries Assistance Office was also contacted in 2012 in regard to past surveys they conducted in Clear Creek.

3.1.3.2 FISHSED Modeling

Cobble embeddedness is a measure of how the rocks in a stream are surrounded, or embedded, by small materials such as silt or sand. Estimates of existing cobble embeddedness in project area streams, combined with NEZSED outputs for peak sediment yield (see Hydrology section), were used to predict potential changes in summer and winter rearing/carrying capacities for trout and salmon, using the FISHSED model (Stowell et al. 1983). The model is run at the Forest Plan prescription watershed level only. The basic model assumes that an inverse relationship exists between the amount of fine sediment in spawning and rearing habitats and fish survival and abundance. In general, when sediment yields are increased over natural rates, especially on a sustained basis, fish biomass decreases (Bjornn et al. 1977). The FISHSED model is only useful for comparing alternatives (USDA Forest Service 2011) and is not designed to predict actual sediment levels. FISHSED calculations and additional information about the model, including assumptions, are in the project file.

3.1.4 Resource Indicators

The following resource indicators were developed in response to public comments and internal concerns and are associated with proposed road-related watershed improvement activities. Timber harvest was not considered, because monitoring indicates that retaining PACFISH buffers are adequate to prevent harvest-related sediment from reaching streams (USDA Forest Service 2009a; USDA Forest Service 2006; FEMAT 1993; K. Smith personal observations).

Roads in RHCAs: Many miles of both system and nonsystem roads exist within PACFISH RHCAs. Many of these roads are not needed for future land management activities. Unneeded roads should be decommissioned to reduce potential sediment input into streams from road surface runoff and potential stream-crossing failures.

Resource indicator: RHCA road density

The roads needed for management should not contribute sediment to streams from road surface runoff. Installing culverts that drain onto the forest floor from roadside ditches instead of into stream channels would minimize direct sediment contributions. Installing culverts designed to handle 100-year flow events on all streams would minimize the potential for plugging of the structure by debris. Surfacing roads could also reduce sediment runoff.

Resource indicator: Number of undersized culverts replaced and cross drains added

Deposited Sediment: Excessive amounts of fine sediment, particularly sand, can reduce fish reproduction success by plugging spawning gravels and affecting egg development and/or larval fish emergence (Meehan 1991; Waters 1995). Sand bedload can also decrease food production by scouring or burying gravel substrates and can decrease the amount of fish cover by filling in pools and burying logs (Alexander and Hansen 1983, 1986). The Forest Plan requires that projects that increase sediment yield in a prescription watershed (to the extent that the activity would be considered an "entry") be modeled in both NEZSED and FISHSED. Activities included in the modeling include timber harvest, temporary road construction, and prescribed fire.

Resource Indicator: FISHSED results for modeled changes in cobble embeddedness

3.1.5 Affected Environment

3.1.5.1 Aquatic Species and Habitats

NFS lands in the Clear Creek drainage contain a minimum of 223 miles of mainstem and tributary streams. Roughly 50 miles are considered fish-bearing; however, no recent fish density information is available.

Habitat for cutthroat trout occurs in all fish-bearing streams. Cutthroat trout were observed between 2010 and 2012 well into the headwaters of most of the streams, but densities were not measured. Surveys conducted by the Forest in 1993 found very high densities of cutthroat trout in Solo Creek and Middle Fork Clear Creek. High concentrations were also found in upper Clear Creek, West Fork Clear Creek, and upper Pine Knob Creek during Nez Perce Tribe surveys (NPT 1984).

Clear Creek includes 35 miles of designated critical habitat for steelhead trout (ESA threatened). Steelhead were found in moderate densities in Pine Knob Creek and Middle Fork Clear Creek, but none were found in Solo Creek (USDA Forest Service 1993) or West Fork Clear Creek (NPT 1984). Low densities were found in South Fork Clear Creek (NPT 1984).

NFS lands along Clear Creek include 13 miles of spring chinook habitat. Habitat for both steelhead and chinook tends to occur in the middle and lower reaches of large streams. Compared to cutthroat trout, these species require larger streams and substrate for spawning and rearing. No chinook were observed during any of the habitat surveys; however, the Kooskia National Fish Hatchery, near the mouth of Clear Creek, annually released 20–30 adult chinook above their trapping weir from 2006 to 2008. These fish likely spawned on the lower reaches of National Forest lands or on private lands (IDFG 2009).

No bull trout were observed during 1993 surveys or during surveys conducted by the USFWS in 2007. Their absence was expected, as water temperatures do not appear to be conducive for this species. Bull trout prefer cold temperatures (below 14 °C) in the summer and are generally found in higher-elevation streams such as those in the upper Lochsa River (well upstream of the project area). Temperatures were measured in project area streams between 2007 and 2011. Daily maximum temperatures during the summer months averaged 16–20 °C in all streams.

No surveys for pearlshell mussels or Pacific lamprey have been conducted in the Clear Creek drainage, and neither of these species was mentioned during habitat surveys. Habitat for both species is likely available in the larger streams where low gradients (<3%) and sandy substrates combine to create preferred habitats.

Two series of bedrock falls act as natural barriers to upstream fish passage in the drainage. One is located 0.6 miles up from the mouth of Hoodoo Creek, and the other is located on the West Fork of Clear Creek, 2.8 miles up from the mouth. Surveys in 2010 and 2011 found no fish above these barriers.

Stream surveys conducted in 1984 indicate high levels of sediment and higher-than-preferred stream temperatures in the lower reaches on private lands. Sediment levels and temperatures were lower on NFS lands. Shallow water depths and lack of pool habitat were also noted as issues affecting fish production in the middle and upper reaches of Clear Creek. Surveys

conducted in 1993 also noted higher-than-preferred sediment and lower-than-preferred wood levels. The low number of pools is directly related to low wood levels, because wood is the primary creator of pool habitats in these stream types.

The Forest Plan contains water quality objectives for streams in the project area (USDA Forest Service 1987b, Appendix A). These objectives are assessed using the DFC Analysis developed by Espinosa (1992) and are based on sediment levels as directed by the Forest Plan Appendix A Guidance document (USDA Forest Service 2011). Specifically, the guidance document states the following:

> Of the basinwide stream survey data collected over the years, the habitat components that appear to be the most repeatable and most reliably differentiate between reference and managed watersheds are measures or estimates of substrate condition, including cobble embeddedness and percent surface fines (USDA Forest Service 1998a, USDA Forest Service 2003). In addition, fish/water quality objectives in Appendix A were originally established based on substrate sediment only (Stowell 1986).
>
> …The portion of the DFC analysis that provides objectives for cobble embeddedness and percent fines by depth would be retained. Collection of measured substrate data, combined with existing legacy data and current PIBO data, where available, would be used to describe the existing condition. Substrate data would be the primary determinant in assessing whether Appendix A fish/water quality objectives are met.

Appendix A states that an upward trend (improvement) is required for streams that do not currently meet the water quality objectives. Timber management can occur in these watersheds concurrent with improvement efforts as long as a positive, upward trend in habitat carrying capacity is evidenced. All streams in the project area are experiencing an upward trend (Table 3-1). Data indicate that all streams (except for the mainstem and Middle Fork Clear Creek) meet the water quality objectives based on cobble embeddedness monitoring.

Table 3-1. Water quality objectives for watersheds in the Clear Creek project area

Forest Plan Prescription Watershed	Forest Plan Water Quality Objective	Fishery Habitat Potential 1987	Percent Cobble Embeddedness (year)	Fishery Habitat Potential[a] 2012
Pine Knob Creek	80%	50%	44% (2012)	65%
Browns Spring Creek	80%	50%	30% (2012)	82%
Clear Creek	90%	50%	38% (2012)	75%
Solo Creek	80%	70%	31% (2012) 46% (1993)	81%
Middle Fork Clear Creek	90%	50%	55% (1993)	55%
West Fork Clear Creek/ Hoodoo Creek	70%	50%	33% (2012)	79%
The two streams below utilized PIBO monitoring % fines by depth data (the most recent data available) in lieu of cobble embeddedness data				
Kay Creek	80%	60%	18% (2007)	95%
South Fork Clear Creek	80%	50%	11% (2010)	100%

[a]Fishery habitat potential is assessed based on the Forest DFC Analysis (Espinosa 1992). Existing cobble embeddedness levels are compared to a DFC graph to obtain the Fishery Habitat Potential percentages. The actual cobble embeddedness level is not equivalent to the Forest Plan Water Quality Objective.

3.1.5.2 Management Activities Affecting Streams

PACFISH was designed to prevent adverse effects to listed fish species in the Columbia River drainage through streamside buffer retention and other guidance for management activities within the buffers. Buffer widths are 300 feet on each side of a fish-bearing stream, 150 feet on perennial non-fish-bearing streams, and 100 feet on intermittent stream channels. At least 10,700 acres (24%) of the analysis area are within PACFISH buffers.

Regeneration timber harvest activities have occurred on approximately 22% of NFS-managed lands with an associated 190 miles of road. No-harvest buffers appear to have been retained since the 1960s on all but about 8% of the units. On the majority of the units (92%), buffers were a minimum of 50 feet wide. A total of 440 acres of regeneration harvest have occurred in the project area since PACFISH was implemented and appropriate-sized buffers were retained. A review of vegetation successional stages within the RHCAs (Figure 3-1) indicates that 9% are early successional (<40 years old), 34% are mid-seral (41–100 years old), 18% are mature (101–149 years old), and 39% are late successional (>150 years old). The majority of mid-seral stands are located in the Clear Creek Roadless Area, lower Hoodoo Creek, and lower West Fork Clear Creek and are a result of the 1931 wildfire that burned in the area. Successional stage information, combined with field reviews of the streams, indicates that RHCAs are well vegetated and only minimally (10%) affected by past timber harvest activities.

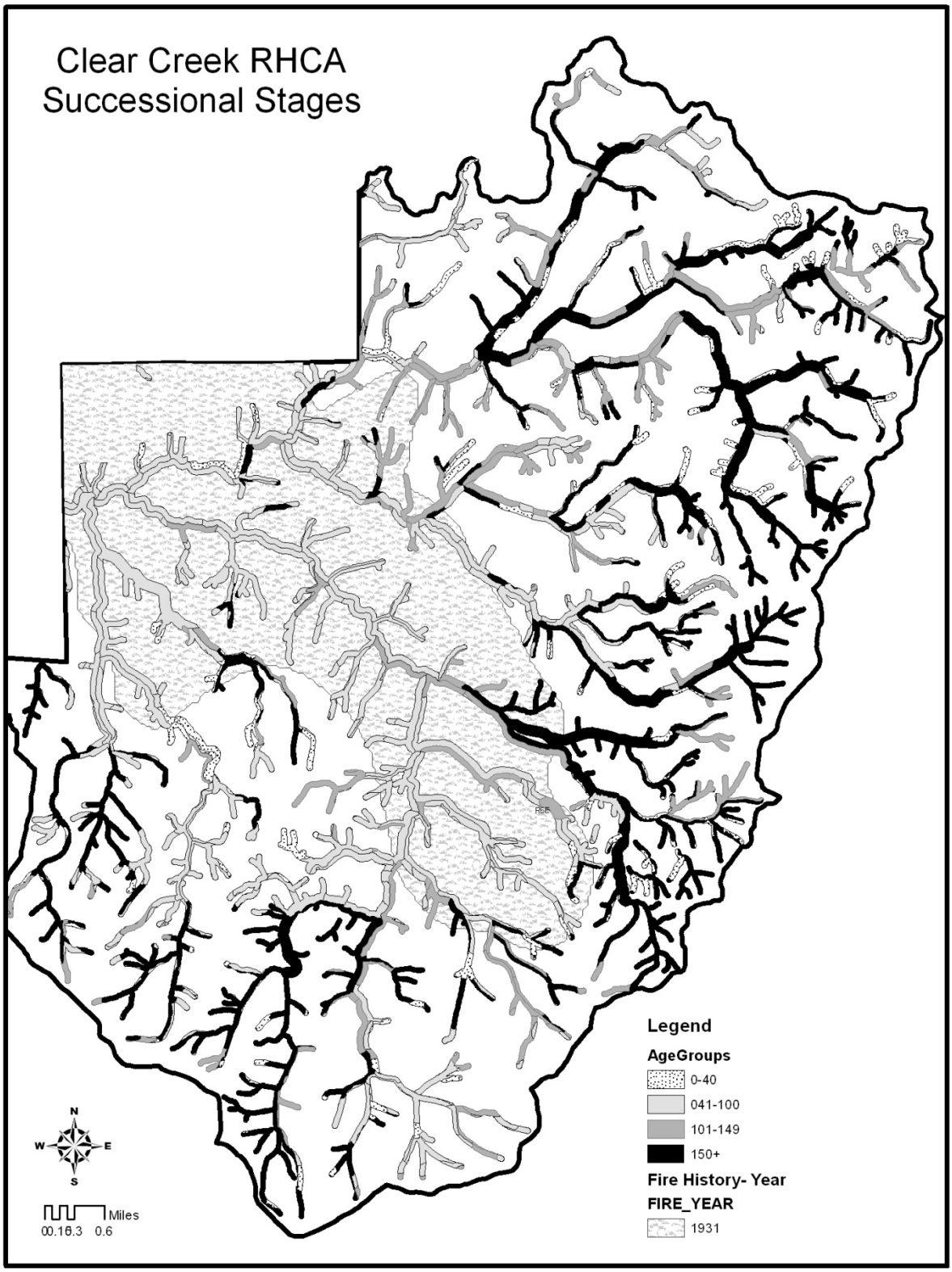

Figure 3-1. Vegetation successional stages within riparian habitat conservation areas in the Clear Creek project area

Roads near streams are the primary land management–related activity that affects stream conditions in the project area. Roads within riparian zones confine channels, which can negatively affect sediment and stream flow movement (Meehan 1991). Culverts under the roads are often undersized, impeding the passage of water and woody material during high flows. The small culvert size increases the risk that the pipe will plug with material and fail during high-flow events. Plugging of pipes can lead to an unwanted sediment pulse in streams. Crossing failures are costly to fix, and the sediment delivered to streams can take decades to flush out of the system. Road failures disturb existing vegetation and expose bare soil to potential erosion until the site heals. Riparian roads reduce stream shading and disrupt large, woody material recruitment through tree removal. Ditchlines that drain roads can direct flow and road surface sediment into perennial streams at crossings. These roads can be a chronic (ongoing) source of sediment and can increase water yield in streams.

The US Forest Service, BLM, USFWS, and NOAA (NOAA 1998) have determined that watershed conditions can be rated "good" when streamside road densities are <1 mile per square mile (mi/mi^2), "moderate" at 1–2 mi/mi^2, or "poor" at >2 mi/mi^2. A total of 20 miles of NFS system roads exist within PACFISH buffers, contributing to an overall road density of 1.2 mi/mi^2. All but portions of 3 roads have been constructed perpendicular to streams instead of running along their length. This design limits the negative effects from roads on streams by minimizing the interaction between the two. In addition, work has begun on 85 miles of system and nonsystem roads, which were cleared for decommissioning in 2011. The roadwork includes 3.5 miles of roads in RHCAs and at least 11 stream crossing removals.

Stream/road crossing surveys have been conducted on 90% of the NFS roads from 2010 through 2011. Only those roads proposed for retention were reviewed, since all crossings on roads proposed for decommissioning would be removed. A total of 200 crossings were assessed for condition, aquatic passage, potential failure risk, and level of work needed. Culverts or bridges were in place at 168 crossings; at 14 crossings, roads were in place, but culverts had been removed. A total of 10 culverts were cleared through previous NEPA for replacement. Four of these were replaced in 2012; two will be replaced in 2013. The remaining 4 will be replaced in 2014 and beyond. A total of 4 culverts were cleared for removal in 2011, with all being removed in 2012 and 2013.

The road reviews found 62 culverts ("pipes") that were adequately sized and had no need for work; 26 pipes in need of cleaning; 1 moderate-priority pipe needing removal; and 79 culverts in need of replacement (1 high-priority, 43 moderate-priority, and 35 low-priority). Roughly 46 of the pipes (58%) drain very small streams or seeps and would be replaced with 24- to 36-inch-diameter structures. The remaining 33 pipes would be replaced with structures ranging from 4 to 9 feet in diameter.

NFS system roads within the project area total 190 miles, of which 147 miles (77%) are graveled roads and 43 miles (23%) are native surfaced (dirt). Placing gravel on roads has been shown to reduce sediment runoff from the road surface (Meehan 1991). Burroughs and King (1985) conducted a study in Idaho using simulated rainfall to generate runoff and sediment yield from forest roads, ditchlines, and fill slopes. Results from the study showed that gravel reduced sediment yield by a factor of 4 when compared to no surfacing. They also found that where dense grass cover was present on the fill slopes of the road, sediment yield was reduced by 99%. The cut and fill slopes of roads within the Clear Creek project area are densely vegetated with grasses, shrubs, and trees. The majority of ditchlines also contain

grasses, which can trap sediment. These conditions, along with the perpendicular stream/road crossings mentioned previously, minimize the risk of roads contributing large amounts of sediment to streams.

Road use by motorized traffic disturbs the road surface, with some of the soil being deposited into ditchlines, where it can be delivered to streams (Meehan 1991). Within the project area, 106 miles of roads are open seasonally or year-round to motorized use. A total of 66 miles (62%) are graveled, and 40 miles (38%) have a native surface. The combination of gravel surfacing and restricting traffic on half of the roads has helped to minimize sediment input to streams.

The overall risk of roads contributing sediment to streams is considered low on 153 miles of road. The low risk is associated with restricted-use roads, roads with gravel surfacing, and roads where live stream crossings are limited or nonexistent. The risk is moderate on the remaining 37 miles of road, as these roads include multiple live stream crossings and some form of motorized use.

3.1.5.3 Effectiveness of Design Features

As noted in Chapter 2, several design features have been proposed to reduce the potential effects of activities on the aquatic resource. These design features have been demonstrated as effective as described below.

PACFISH buffers—All management activities since 1995 have implemented PACFISH buffers in order to eliminate or reduce impacts to riparian areas and streams. With no new large disturbances in RHCAs, no negative changes to the measured habitat parameters are expected to result from more recent management activities. Various field reviews and monitoring activities support the conclusion that the habitat conditions have improved since the writing of the Forest Plan in 1987 (see Water Quality Objectives table in the Existing Condition section). Much of the recovery is likely a result of fewer land-disturbing activities, better application of BMPs, PACFISH buffer retention, and better road design (USDA Forest Service 2009a, p. 91). Preliminary monitoring results from the PIBO monitoring across the Upper Columbia River Basin also indicate improving trends. Improvements have been noted in pool depth, bank stability, large wood frequency and volume, and the presence of spawning substrate (<3 inches in diameter) (USDA Forest Service 2009a).

BMPs would be followed for all action alternatives as stipulated by the Idaho Forest Practices Act. Idaho water quality standards regulate non-point source pollution from timber management and road construction activities through the application of BMPs. The adjacent Clearwater National Forest has an excellent record of successful implementation of BMPs. Between 1990 and 2002, the Forest had a BMP implementation rate of 98% and a 97.8% rate of effectiveness (Clearwater National Forest 2003). Survey results from 2004 through 2008 indicate implementation and effectiveness rates of 98% or greater (these reports can be found at http://www.fs.fed.us/r1/clearwater/ResourceProg/ResourceProg.htm). The same BMPs would be applied to the project and are expected to have similar results.

3.1.6 Environmental Consequences

3.1.6.1 Direct and Indirect Effects

As noted above, the analysis area for the direct and indirect effects of the alternatives is the project area.

3.1.6.1.1 Alternative A—No Action

No logging, no road decommissioning, and no culvert replacements, additions, or removals would occur under the No Action Alternative. Any watershed improvement activities (culvert replacements through road reconstruction and decommissioning) would require additional NEPA analysis prior to implementation.

No direct effects to streams would result from the No Action Alternative, since no stream channels or streamside areas would be disturbed.

The indirect effects include the following:

- Roads needed for future management that may be contributing sediment to streams would continue to do so until further NEPA is completed and funding is obtained to improve them. Culverts would remain undersized, and ditchlines would remain connected to streams. Thirty-seven miles of road would be maintained in the moderate-risk category for sediment entering streams from ditchlines. Roughly 79 crossings would remain at risk for failure due to retention of undersized culverts. An estimated average of 100 cubic yards of soil could be delivered to a stream in the event of one crossing failure.
- The 3.2 miles of NFS system roads proposed for decommissioning within RHCAs could continue to deliver sediment to streams through road surface erosion or future failure. A total of 17 stream crossings are associated with these roads. The risk is considered low for all but 1 mile of road. The 1 mile of NFS road 77781 at the head of Big Cedar Creek has the highest risk of effects because it runs adjacent to the stream and occurs within 150 feet of it on average. Road densities in RHCAs would remain at 1.2 mi/mi^2.
- No management-related changes, either positive or negative, would occur in the existing aquatic habitat condition. Instream and riparian processes of habitat development and wood recruitment would continue in the project area. Riparian habitat conditions would continue to improve as growing, aging trees gradually provide shade and large, woody debris to streams.

Alternative A would inhibit the ability of the Forest to further limit or reduce sediment delivery to streams from roads in order to meet or maintain Forest Plan water quality objectives. In the event of stream crossing failures, this alternative has the potential to affect the Idaho state standard for cold water aquatic life and salmonid spawning. The risk of crossing failures increases as culverts age and their conditions deteriorate. This alternative does not include other management activities that would affect beneficial uses.

3.1.6.1.2 Alternatives B, C, and D

Design features would be used to minimize direct input of sediment to streams from management activities. PACFISH buffers would be retained on perennial and intermittent

streams adjacent to timber harvest units. Temporary roads would be built along or near ridgetops with no stream crossings. Road reconstruction would install cross-drain culverts to divert roadside ditch flow onto the forest floor instead of into streams. Road surfacing with gravel would also occur where needed. Road decommissioning would remove all perennial and intermittent stream channel crossings and would recontour roads within RHCAs. No prescribed fire would be ignited within PACFISH buffers, though low-intensity fire would be allowed to back into them. Grassland improvement activities would occur outside of PACFISH buffers.

Few if any *direct effects* would occur to fish or their habitat from implementing the action alternatives, due to the following:

- PACFISH buffer retention would prevent any direct effects to fish or their habitat from timber harvest, precommercial thinning, or prescribed fire activities taking place under the action alternatives. All vegetation would be retained within the buffers. Data have shown that buffers are adequate to prevent sediment input into streams (USDA Forest Service 2006; FEMAT 1993; K. Smith personal observations). All potential instream and riparian woody debris would be retained, and no streamside vegetation would be removed. No disturbance would occur in riparian areas or stream channels during timber harvest, and past monitoring indicates that little disturbance would be expected from prescribed fire.
- Road decommissioning in all the action alternatives would remove 3.2 miles of roads from RHCAs, and all affected areas would be fully recontoured. This decommissioning would result in a 16% reduction in RHCA road miles and the removal of an estimated 17 stream crossings. Decommissioning would return 13 acres of RHCA back into a forested state over time. Road densities in RHCAs would be reduced to 1.0 mi/mi^{2,} which would move the watershed condition category from moderate to good, as defined by NOAA (1998).
- Road reconstruction would replace 77 undersized culverts with culverts sized for a 100-year flow event. Cross-drain culverts would also be installed in ditchlines on both sides of the culverts in order to divert ditchline flow away from the streams.
- Road decommissioning and replacement of undersized culverts are the only activities that would directly affect streams. Instream activities during culvert removals and replacements would introduce locally measurable amounts of sediments immediately downstream of the sites. The sediments and increased turbidity levels would settle out downstream; the distance is expected to be less than 500 feet due to small stream size and low flow during the dry season, when work would occur. This disturbance may degrade substrate conditions, as fine sediments deposit over existing gravels. However, sediment input would occur over a short time frame (1 day per site). The estimated amount of sediment potentially added to a stream from culvert removal is less than 20 pounds (0.04 cubic yards) per site (Foltz et al. 2008). No direct effects to threatened or sensitive aquatic species would occur, as none of these species are known to reside within a minimum of 1,000 feet of any of the removal sites. Culvert removals would provide a direct benefit to all aquatic species by eliminating the risk of future crossing failures

- Culvert removal and replacement would remove about 0.1 acres of riparian vegetation at each site. Removing primarily shrubs and small trees is unlikely to cause stream temperature increases, because the area affected is small (estimated to be <10 acres for all sites combined). No measurable changes to stream temperatures are expected, because all streams above and below the work sites are well shaded by dense vegetation (shrubs/trees).
- No direct effects to streams would occur from road reconditioning or cross-drain culvert installation activities since no stream channels would be disturbed. Cross-drain culverts will be installed an average of 50 feet away from stream channels, and no mechanism is present to deliver sediment to streams from this activity.
- No direct effects to streams and threatened or sensitive aquatic species would occur from temporary road construction activities since all roads would be located on or near ridgetops where there are no stream crossings and would be decommissioned after use. No mechanisms are present that could deliver sediment into stream channels from these roads; PACFISH buffers and vegetation and woody debris left within harvest units act as barriers to potential sediment delivery. The action alternatives would not directly affect Idaho State standards for cold water aquatic life, secondary contact recreation, or salmonid spawning.

The indirect effects to fish or their habitat from implementing the action alternatives would be minimal to beneficial because of the following:

- No indirect effects to streams would occur from timber harvest or temporary road construction. PACFISH buffers are effective at preventing sediment delivery to streams from these activities. They are also effective at maintaining stream temperatures. Road reconditioning—including road surfacing and removal of small slumps that block ditchlines, divert water onto the road surface, and cause surface erosion—would be beneficial to streams. Monitoring of other projects indicates that no indirect effects should be expected from low-intensity prescribed fire that would be allowed to back into PACFISH buffers. This type of fire does not typically make its way to riparian areas or streams.
- No effects to PACFISH RMOs (pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width-to-depth ratio) are expected, because riparian areas would not be disturbed. As noted in the Watershed section, water yield is not expected to increase to the point where it would decrease bank stability, and sediment yield would not increase sediment delivery to the point where it would affect width-to-depth ratios.
- Road decommissioning would remove 17 crossings and the fill material associated with them. This removal would eliminate the risk of crossing failures at these sites and subsequent input of at least 1,700 cubic yards of soil into streams. Decommissioning would provide for long-term beneficial effects to streams.
- Road reconstruction under all action alternatives would reduce the risk of sediment delivery to streams. Culverts would be replaced and cross-drain culverts installed at 77 stream crossings under all the action alternatives. After project activities are complete, 10 undersized culverts would remain on NFS lands. All

occur on small, fishless streams. New cross-drain culverts would intercept ditchline flow and route sediment away from stream channels. Preliminary monitoring of similar pipes in the Fan Creek drainage indicates that the risk of sediment entering streams after the work is complete would be almost nonexistent (K. Smith, personal observation, 2008). Monitoring showed that only 1 out of 37 pipes routed ditchline flow down the forested slope and into a stream channel. A different design on that one pipe would have prevented any routing to the stream. The remaining pipes routed sediment for an average of 40 feet downslope from the culvert outlet, with no delivery to streams. Road reconstruction activities would allow for a continued improving trend that could help to meet or maintain Forest Plan desired sediment conditions in Clear Creek and its tributaries.

- FISHSED modeling indicates minor effects to deposited sediment. Modeled changes for cobble embeddedness increase by 1%–2% under all alternatives for Hoodoo, Solo, Pine Knob, Browns Spring, Clear Creek, and Middle Fork Clear Creek prescription watersheds. No changes in cobble embeddedness occurred for South Fork Clear Creek and Kay Creek under any alternative.
- FISHSED modeling indicates a 1% decrease in summer rearing capacity in all but the South Fork Clear Creek prescription watershed for all action alternatives.
- FISHSED modeling shows a 1%–2% decrease in winter rearing capacity for all action alternatives in Hoodoo, Solo, Browns Spring, Pine Knob, Clear Creek, and South Fork Clear Creek prescription watersheds. No changes occurred in Middle Fork Clear Creek or Kay Creek.
- Lower Clear Creek Face and Big Cedar Creek prescription watersheds were not assigned fish/water quality objectives or sediment yield guidelines, primarily because most of the area is on private lands; subsequently, no FISHSED models were run for these two prescription watersheds.
- In summary, FISHSED modeling predicts a 0%–2% change in cobble embeddedness and summer/winter rearing capacity for juvenile steelhead trout rearing in B channel types for the action alternatives. Predicted changes are less than 10%. FISHSED is most appropriately used to assess the effects of changes in habitat quality when cobble embeddedness changes are greater than 10% (Stowell et al. 1983). No measurable changes in cobble embeddedness and summer/winter habitat rearing capacity are therefore expected based on this modeling.
- The action alternatives would indirectly result in minor, short-term localized negative effects to cold water aquatic life during culvert removals and replacements. Because these activities are designed to improve conditions over the long term, all state designated beneficial uses would be maintained over the long term.

3.1.6.2 Cumulative Effects

The cumulative effects analysis area is the entire 58,990-acre Clear Creek drainage. It includes all federal, State, and private lands in the watershed. This analysis area was selected since activities outside of the drainage would have no effects on aquatic habitats within the drainage. Quantitative information was available for roads only. Google Earth was used to assess riparian conditions and the analysis is presented in qualitative form.

The time frame considered for cumulative effects is 2014 to 2022. This period covers all road reconstruction and decommissioning activities from the beginning of the project until 2 years after these activities are expected to be completed. The additional 2 years after project completion is the expected amount of time it would take for shrubs and ground cover to respond after culvert replacement or decommissioning activities occur. The growth of shrubs and other ground cover limits overland flow of sediment after these activities.

This analysis considers only those activities that affect road densities, culvert size, or cobble embeddedness levels (as modeled by FISHSED) during the cumulative effects time frame. The existing condition includes all past road building, fish passage culvert replacement, and decommissioning activities through 2012. The activities considered for cumulative effects are proposed project road decommissioning and road reconstruction activities in combination with the Browns Spring Creek Culvert Replacement Project (2013/2014), the proposed Clear Ridge Non-system Road Decommissioning Project (2014 and beyond), and 2 culvert replacements on county roads in lower Clear Creek that occurred in 2011.

Culvert inventories found the Browns Spring culverts to be undersized but contain no fish. One was a moderate priority for replacement and the other a low priority. Both will be replaced with structures sized for a 100-year flow event. The Clear Ridge Non-system Road Decommissioning Project would remove about 15 crossings and 8 miles of roads within RHCAs. Decommissioning nonsystem roads would reestablish vegetation on 32 acres of RHCAs. These projects could add locally measurable amounts of sediments to streams, as discussed above under the road decommissioning portion of this analysis. Sediment is not expected to travel more than 500 feet downstream, due to the timing of installation (i.e., during low-flow periods) and BMP implementation to control sediment. Crossing removals are beneficial but are not included in the calculation for stream crossings, because the streams were not surveyed and it is not known if the crossings currently exist. A long-term beneficial effect would be associated with crossing removals.

3.1.6.2.1 Alternative A

Lower Clear Creek has 4 appropriately sized stream crossings (2 bridges and 2 culverts) on county roads. Future foreseeable federal actions include the Browns Spring Creek Culvert Replacement Project and the Clear Ridge Non-system Road Decommissioning Project. This alternative would cumulatively retain 113, or 95%, of the undersized culverts in the watershed. The Clear Ridge project would decommission 8 miles of roads in RHCAs; however, road densities would not be affected since nonsystem roads are not included in road density calculations. However, both of these projects would provide a beneficial effect from potential sediment reductions to streams. No cumulative effects to cobble embeddedness (as modeled by FISHSED) would occur since road decommissioning and culvert replacements are not accounted for in the NEZSED or FISHSED models.

3.1.6.2.2 Alternatives B, C, and D

The proposed project activities, when combined with past and foreseeable federal activities, would cumulatively reduce RHCA road density from 2.2 mi/mi^2 to 2.0 mi/mi^2 at the watershed scale. This improvement would move the Clear Creek watershed from poor condition to moderate condition (NOAA 1998). The action alternatives would cumulatively retain 36, or 30%, of the undersized culverts in the watershed. Road decommissioning would cumulatively return 45 acres of RHCAs to a forested condition.

No cumulative effects to cobble embeddedness, summer rearing, or winter rearing capacity would occur, as FISHSED-modeled changes indicated no measurable change in these factors. Culvert replacement or decommissioning activities cannot be modeled in NEZSED or FISHSED and were therefore not assessed for cumulative effects related to sediment that may be produced from these activities.

Culvert replacement and road decommissioning activities would produce an overall positive cumulative effect to aquatic habitat and species in the project area. No measurable negative cumulative effects to instream sediment are expected as a result of any of the action alternatives when combined with State/private lands and other projects on federal lands.

3.2 ECONOMICS

3.2.1 Analysis Area

The project area is located within Idaho County, Idaho. The economic analysis area includes local towns and communities influenced by the timber sale activities. These towns include Grangeville, Elk City, Kamiah, Kooskia, Harpster, Stites, Clearwater, Orofino, Pierce, Weippe, and Lewiston. The timber sale influence on these towns depends on their proximity to the watershed, their economic dependence on it, and their historic use of the watershed dating to settlement more than 100 years ago. The Nez Perce National Forest has provided wood to local mills since the 1930s. The Forest's output, along with BLM timber outputs, accounted for half the total timber harvested in Idaho County in the mid-1990s. Most of the Forest timber output was processed in mills located in or near the towns mentioned previously.

3.2.2 Regulatory Framework

The project complies with Forest Plan direction to develop cost-effective projects, and it complies with the NFMA by emphasizing resource management over timber volume output.

3.2.2.1 National Forest Management Act

The NFMA requires that a sale "consider the economic stability of communities whose economies are dependent on such national forest materials, or achieve such other objectives as the Secretary deems necessary" (NFMA, Sec. 14, e,1,c). The NFMA also requires that "the harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber" (NFMA, Sec. 6, g,3,E,IV). The project meets the requirements of the NFMA by using the IMPLAN model to evaluate how each alternative would affect economic stability in local communities. The project also uses harvest systems that are based on ground-truthed silvicultural practices, not on the highest dollar return, to achieve the desired long-term forest and access needs.

3.2.2.2 Forest Service Manual

The FSM directs that economic feasibility be considered in project design during the early planning and NEPA documentation. A sale feasibility analysis was done at Gate 1, which led to consideration of treatments providing cost-reducing economic benefits. One major adjustment was the use of mechanical site preparation versus burning site preparation methods where possible. The mechanical methods provide better leave tree survival and utilize cheaper purchaser-supplied equipment.

3.2.2.3 Forest Plan

The Forest Plan requires that the project provide a sustained yield of resource outputs at a level that will help support the economic structure of local communities and provide for regional and national needs (USDA Forest Service 1987b, Goal A.1, page II-1). Alternative A would not contribute toward the Forest Timber sale program or support the economic timber harvesting structure of the local communities, while Alternatives B, C, and D would. Alternative C would best meet this goal.

3.2.2.4 Executive Order 12898

EO 12898 requires that each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories.

The Clear Creek analysis did not reveal any disproportionately high and adverse impacts to minority populations or low-income populations. None of the action alternatives are expected to negatively affect minority or low-income populations or any United States citizen. No environmental health hazards are expected to result from implementation of any alternative. This project would not disproportionately affect income level in the economic analysis area.

3.2.3 Resource Indicators

Timber harvest–related jobs and income:

Jobs and income generated from the project contribute to community stability.

Sale feasibility:

Sale feasibility is represented by the Present Net Value (PNV). A project with a positive PNV would be a sellable project. A project with a negative PNV would either not sell or require supplemental funding to make it sellable.

3.2.4 Analysis Methodology

The Nez Perce National Forest Plan Final Environmental Impact Statement (FEIS) (USDA Forest Service 1987a) describes the economic impacts of implementing the Forest Plan. The Forest Plan addresses the economic analysis process and values placed on nonconsumptive items such as recreation opportunities, community stability, cultural resources, habitats, and populations. This economic analysis will not revisit the information presented in the Forest Plan and will focus only on those costs and revenues associated with implementing the proposed activities in the project area.

The Forest Service Micro IMPLAN model was used to derive the indirect and induced economic effects. Direct economic effects were derived from mill surveys conducted by the Bureau of Business and Economic Research at the University of Montana. The following response coefficients found in the table were developed for the 1997 Clearwater National Forest Timber Sale Program Information Reporting System (TSPIRS). TSPIRS, a reporting system developed jointly with the General Accounting Office (GAO) and the Forest Service, has been reviewed and approved by Congress.

The coefficients from the Forest Service Micro IMPLAN model to derive the indirect and induced economic effects are as follows:

- Harvest-Related Jobs Generated: 13.5 per 100,000 cubic feet (MCCF)
- Harvest Income to Communities: $383,406 per MCCF
- Federal Income Tax Generated: $57,511 per MCCF

The Region 1 Gate 1 and 2 spreadsheet and the Quicksilver model with Nez Perce–Clearwater National Forests area factors were used to determine sale feasibility and appraised value. The Quicksilver model uses recent transactional evidence based on local timber sales to determine sale value. The timber stand database and extensive field reviews were used to determine timber volume and species composition; these are the two primary factors determining gross value of a timber sale. Net value depends on costs for logging system, haul distance, slash disposal, planting, and mitigation activities. The cost estimates for this sale are based on recent similar sales in the vicinity.

3.2.5 Affected Environment

In a report for the Interior Columbia Basin Ecosystem Management Project (Columbia Basin Assessment), titled "Rural Communities in the Inland Northwest," communities are characterized in terms of their ability to manage change and adapt to it in positive, constructive ways. The report emphasizes community resiliency, which is a function of community conditions such as economic structure, infrastructure, civic leadership, cohesiveness, and amenities.

The Columbia Basin Assessment resiliency ratings for Idaho County (Kooskia and Grangeville) and Clearwater County (Orofino, Pierce, and Weippe) are low. However, preliminary findings from a study recently completed by University of Idaho sociologists working on the Columbia River Basin Assessment show that many timber-dependent communities tend to be more resilient and able to tolerate change than is commonly assumed. The resiliency rating for Nez Perce County (Lewiston) is high. The towns of Grangeville, Orofino, Weippe, Pierce, and Lewiston all show high to very high historic employment in the wood products manufacturing industry per the Columbia Basin Assessment.

As of August 2012, Idaho County had an unemployment rate of 9.4%, and the rate in Clearwater County was 13.0% (4th highest in Idaho). The average unemployment rate in Idaho is 6.9%, and the national average is 8.1%. In addition, counties dependent on federal timber receipts to help fund schools and highways find that this source of funding is drying up, so they have relied more heavily on taxes to bolster their income, to the detriment of low-income families and the unemployed who feel that timber harvest should contribute more.

Idaho has always been a natural resource–based state, although as natural resource extraction declines, the state has moved toward diversification. Many communities have made impressive strides in achieving Idaho Gem Community status and working to diversify their economies. (The Gem Community program was established by the Idaho Department of Commerce to encourage communities to plan their futures.) As reported by the Idaho Department of Labor, the timber products industry went through hard times in the early 1980s, but the firms that survived were streamlined and modernized with the hope to have a consistent supply of timber from National Forest lands.

3.2.6 Environmental Consequences

3.2.6.1 Direct and Indirect Effects

3.2.6.1.1 Alternatives A, B, C, and D

Table 3-2 displays the job and income consequences of implementing the timber harvest alternatives. The Forest Service Micro IMPLAN model was used to derive the indirect and induced economic effects of the timber harvesting; the model does not reflect additional jobs and income related to implementation of the non-timber harvest stewardship activities, such as precommercial thinning and road decommissioning, which are the same for all the action alternatives. These stewardship activities would generate some additional jobs, but not to a level like the timber harvest and would not point to any alternative as generating more than the other because they would be the same between alternatives, except for the no action alternative.

Alternative A (No Action) would not generate any timber harvest jobs. Alternative C would generate the most jobs and revenue, because it generates the most timber volume, followed by Alternatives B and D.

The other activities being proposed along with timber management, such as road decommissioning, precommercial thinning, broadcast burning, and reforestation, also provide jobs and income to the local economy. For example, in addition to providing jobs for heavy equipment operators required to decommission the roads, the project will create jobs for laborers performing erosion control and project inspection.

Table 3-2. Timber harvest jobs and income

Alternative	Volume (CCF)	Jobs Sustained	Community Harvest Income	Federal Income Tax
A	0	0	0	0
B	141,500	1,910	$54,252,000	$8,138,000
C	158,000	2,133	$60,578,000	$9,087,000
D	116,400	1,571	$44,628,000	$6,694,000

Predicted Stumpage and Present Net Value—Each alternative produces different benefits and costs associated with the timber harvest, roadwork, fuel treatment, reforestation, mitigation measures (skid trail decompaction), and other related timber harvest activities. This part of the economic analysis compares the differences in benefits and costs by examining the timber's appraised value and PNV for each alternative. The appraised value is the timber value based on recent bidding—that is, the amount the Nez Perce National Forest anticipates the timber would sell for minus costs for logging, road reconstruction, site preparation/fuel abatement, and mitigation. The PNV is the anticipated selling value minus the costs to implement the sale and reforest the land. An alternative with a positive PNV has stumpage values exceeding costs, whereas an alternative with a negative PNV has costs in excess of stumpage values and may require supplemental funding to complete all activities.

Information provided by the economic models is used as a tool to understand the relative monetary differences between alternatives rather than to predict exact values for each alternative, since the variables may change between now and the time the timber sells.

Alternative A (No Action) does not generate any value or accrue any costs associated with the NEPA decision, so its PNV is zero. However, Alternative A would not be able to offset the $175,000 cost of doing the NEPA analysis. Tree mortality is occurring in many of the areas planned for regeneration. If a large wildfire (100+ acres) were to start as a result of fuel buildup from the anticipated tree mortality, fire suppression costs would likely exceed $300,000 (for comparison, the 350-acre Granite Fire of 2011 cost $2.2 million).

Alternatives B, C, and D are all predicted to generate enough stumpage value to cover all of the sale costs, plus reforestation, while also capturing the timber value before it deteriorates from tree mortality. All of these alternatives should generate revenue, with Alternative B being the most economically feasible and generating the highest revenue (Table 3-3).

All the action alternatives would use a combination of Forest Service burning and/or machine piling for the reforestation site preparation. Site preparation and tree planting are the two largest single-cost activities associated with implementing the different alternatives, but since each action alternative has the same costs per acre, the economic effect is proportional to the amount of acres needing site preparation and planting. To reduce reforestation costs, natural regeneration should be implemented where possible and where it meets the project purpose and need. Table 3-2 displays the predicted appraised total and PNV for each alternative. As noted in the table, Alternative C produces the most volume, but Alternative B provides the greatest revenue, because Alternative B requires less site preparation and involves lower planting costs than Alternative C. Alternative B has higher site preparation and planting costs than Alternative D, but Alternative B generates enough commercial thin volume that reforestation is not required to offset the other costs (Alternative B thus produces a higher overall economic return).

Table 3-3. Predicted stumpage and Present Net Value

Alt.	Volume CCF	Volume MBF	Appraised Total[a]	Reforestation[b]	Implementation[c]	Present Net Value	Stewardship Costs[d]
A	0	0	$0	$0	$0	$0	$0
B	141,500	75,300	$6,505,000	$1,925,000	$409,000	$4,171,000	$1,258,000
C	158,000	85,200	$5,634,000	$3,067,000	$454,000	$2,113,000	$1,258,000
D	116,400	61,800	$4,131,000	$1,067,000	$385,000	$2,679,000	$1,258,000

[a] Appraised value bid includes slash treatment, skid trail decommissioning, and road costs associated with the harvest.
[b] Reforestation costs include planting costs (trees, labor, and pre/post-treatment exams with overhead).
[c] Implementation costs include presale, engineering, and administration costs. NEPA costs, which total about $175,000, are not included in this cost total.
[d] Stewardship costs include precommercial thinning, road decommissioning, grass restoration, and landscape prescribed burning.

3.2.6.2 Cumulative Effects

The cumulative effects area includes Clearwater, Idaho, Lewis, and Nez Perce counties in Idaho. The timber volume is scheduled to be sold through 5 different sales over a 5-year period, starting in 2014. Typical sale duration would be 4 years each; the last sale would be completed in 2022 (harvest activities usually do not start on the first year a sale is sold), for a total of about 8 years of harvest activities. Post-harvest reforestation and site preparation work could continue for up to 5 years following harvest on the last sale, creating a potential end date of 2027, for a total of 13 years of harvest plus post-harvest activities.

Economic impacts for activities such as logging and sawmilling lumber are shown in the section above. These impacts are described as direct and indirect effects, but they are also considered cumulative effects due to the additional jobs, taxes, and income they provide. When impacts from additional jobs and income are taken into account, this project contributes to the Forest's 5-year timber sale plan and may boost the Forest's output by 10 million board feet per year. Current sold sales and foreseeable local sales, as shown on the Forest's Five Year Action Plan, would also affect the same communities and contribute to the long-term timber flow to these communities.

3.2.6.2.1 Alternative A—No Action

Since this alternative does not propose any timber harvest or other stewardship activities, it would not contribute cumulatively to local community jobs and income. Alternative A would maintain current unmanaged use and related income. It could potentially increase future firefighting costs and locally generated income as trees die and create excessive fuel loadings susceptible to wildfire ignitions.

3.2.6.2.2 Alternatives B, C, and D

Added to the Forest's 5-year timber sale plan, these alternatives would sustain jobs (ranging from 1,571 to 2,133 jobs). However, Alternatives B, C, and D are not expected to generate a large number of jobs or significant amounts of income from timber harvest or roadwork; therefore, these alternatives would not be likely to cumulatively affect local communities beyond the past 3-year employment averages. The mills tend to adjust their annual production to sustain long-term outputs (instead of boom-and-bust cycles) by purchasing private and State timber along with National Forest sales.

Prescribed burning is planned in association with the previously mentioned timber sale projects. Prescribed burning is mostly handled internally by the Forest Service. Forest Service employees are supported by local community services. The prescribed burning proposed under other projects in the area can be handled with the normal Forest Service workforce and therefore would not have a cumulative effect on the local communities.

Additional stewardship items including road decommissioning, precommercial thinning, and grass restoration would also contribute money to the local communities.

If additional forestry activities are implemented within the counties by the State or by private industry, additional forestry workers may be needed.

3.3 FUELS

3.3.1 Analysis Area

The fuels analysis area encompasses the upper two-thirds of the Clear Creek drainage and all of its tributaries. This area was selected because it includes all Forest NFS managed lands that could be affected by project activities.

3.3.2 Regulatory Framework

Nez Perce National Forest Plan (Forest Plan) direction and all federal and State laws and regulations applicable to fuels would be applied to the project.

Nez Perce National Forest Plan—The project meets the Nez Perce National Forest Plan's specific fire management goal for this area, which is to "protect resource values through cost effective fire and fuels treatment through the utilization of material and using prescribed fire" (USDA Forest Service 1987b, p. II-2).

The modified fuel bed would decrease the probability of stand-replacing crown fire and increase firefighter effectiveness, reducing the probability of resource damage at a lower cost while utilizing wood fiber.

Smoke Management—The Forest Service is a member of the Idaho/Montana Airshed Group. This airshed group is composed of State, federal, tribal, and private organizations that are dedicated to the preservation of air quality in Idaho and Montana. Its members are prescribed burners and the public health and regulatory agencies that regulate the burning cooperatively to prevent smoke impacts from fires designed to accomplish land management objectives. The analysis area falls within Airshed 12B.

Project-related prescribed fire activities would be approved by the airshed group; approval would be contingent on prevailing weather conditions, other planned ignitions in the airshed, and the resultant smoke impacts, including impacts to the Selway-Bitterroot Wilderness (a Class 1 airshed).

3.3.3 Resource Indicators

Issue: From a fuels perspective, the vegetation includes little variation. Variations can create barriers that can slow a fire or alter its behavior (such as dropping the fire from the crowns to the ground). Existing areas of past harvest and other vegetation types such as shrubfields could act as barriers; however, they are too small to affect fire behavior at the landscape scale. The current homogeneous fuels support a risk of crown fire that could pose a threat to life, property, and other resource values. Approximately 94% of the project area is in the WUI as defined by the Idaho County Wildfire Mitigation Plan Committee (Idaho County 2009).

Indicator: Percentage of project area that could support a crown fire (active, passive, or conditional)

Issue: Existing landscape health is not consistent with a landscape that operates with a natural disturbance cycle. In this case, fire was the dominant disturbance agent. Mean fire return intervals in some of the landscape are above historical conditions. Age classes are trending toward larger size classes and lacking in early seral size classes. In a healthy landscape, disturbance would create larger patch sizes in a mosaic. In the analysis area, timber harvest has created a smaller, more uniform, linear-edged series of patches; fire exclusion has eliminated any new sizable disturbance-created patches since the early 20th century.

Indicator: Fire Regime Condition Class (FRCC) is a measure of landscape health based on fire return interval and age class distribution. It describes the degree of departure between the current vegetation and a simulated historical reference condition. Patch size accounts for the spatial distribution across the landscape.

3.3.4 Analysis Methodology

Field Sampled Vegetation (FSVeg) stand exam data were collected for the treatment units and other stands within the project area in 2011. This information was processed through the Forest Vegetation Simulator and Fire and Fuels Extension (FVS/FFE) model (Reinhardt and Crookston 2003). Outputs from this model include surface fuel loadings, fire behavior fuel models, canopy base height, and aerial fuel loadings that determine whether a fire is a surface fire or crown fire. Techniques to reduce crown fire occurrence and severity include the following: increase canopy base height; reduce canopy bulk density; reduce forest canopy continuity; and reduce surface fuels (Scott and Burgan 2005). With the exception of Alternative A, the proposed treatments accomplish some or all of the techniques. The FSVeg Spatial Data Analyzer v2.3.0 was used to collectively grow the stands through 10-year timesteps to visually show the changes through space and time.

Fire type (surface or crown) was modeled in FVS/FFE under 97th-percentile weather conditions, representing extreme fire weather. Weather data from June 1 through September 30 were selected to represent the entire summer fire season. Percentile weather was computed using Fire Family Plus (Main et al. 1990). Twenty years (1990–2010) of weather data from the most representative weather station were analyzed to determine weather conditions.

Two different analyses of landscape health using FRCC were conducted. One used the FRCC software and direction outlined in the Interagency FRCC Guidebook. The silviculturist developed a crosswalk between LANDFIRE Biophysical settings and VRUs; tree size class was determined by using the R1 Vmap vegetation layer. The second analysis was used only for describing the existing condition and utilized the FRCC Mapping Tool software and LANDFIRE vegetation layers. The patch size analysis (FRAGSTATS, see Silviculture report in the project record) indicates whether the area will trend toward desired conditions after treatments are completed.

3.3.5 Affected Environment

3.3.5.1 Fire Occurrence, History and Risks

Historically, fire was the primary disturbance factor that shaped the composition and structure of forests in the Clear Creek drainage. The largest wildfires burned 27,245 acres between 1870 and the 1931 fire, which burned approximately 11,000 acres. Only 155 acres have burned since then. Overlaps in fires occurred mostly on the South Fork Clear Creek area between the late 1800s and 1931, with other minor overlaps occurring later. The overlap in all fires totals about 7,900 acres. The total area burned was therefore approximately 19,490 acres, or 45% of the drainage. Fires burned mostly on dry-to-moist habitat types of the South Fork, mainstem, and Middle Fork of Clear Creek. Stand-replacement fire occurred in the South Fork, while mixed-severity fires occurred in the upper Clear Creek and Solo Creek areas. The determination of severity was based on the overall age class distribution of trees in the area.

No large fires have been documented in the moist habitat types in the headwaters of the drainage within the last 150 years. As the forests in these habitat types begin to age, they become more susceptible to mortality from insects and disease, which increases the risk of crown fire. This weakness was observed in the upper South Fork Clear Creek area in the

summer of 2011, when an infestation of the Douglas-fir tussock moth (a defoliator) began occurring. Damage to trees was noticeable over about 3,000 acres. The severity of the infestation will not be known until 2013. Affected trees can recover from an initial insect attack; however, if another outbreak occurs in 2013, and trees are attacked a second time, mortality will likely occur. Typically, the second infestation kills the trees.

Since tracking began in the 1970s, a total of 285 fire starts have occurred in Clear Creek. The number of starts per decade ranges from 53 to 90. The total acreage burned ranges from 19 to 80 acres per decade since 1932.

Effective wildfire suppression since the early 1900s has greatly reduced fire frequency in the area. Fires that occur in the area are suppressed due to the proximity to private property adjacent to the forest boundary and the timber management areas. Current fuel profiles would allow crown fires to establish in over 50% of the area. Once established, these fires are virtually impossible to stop without the fire running into a barrier (such as a change in fuel type) or the weather variables changing (such as relative humidity rising overnight). Indirect suppression strategies would need to be employed for a crown fire. Conditions like these can lead to large amounts of burned acreage, high costs, and adverse impacts to resources including soils, wildlife, water resources, and infrastructure.

Approximately 94% of the project area lies within the rural Salmon-Clearwater WUI. The WUI designation was determined by Idaho County and a group of collaborators in 2005 and revised in 2009 as mandated by the National Fire Plan of 2001 (USDI and USDA 2001). This mandate allowed each County to determine its own definition of WUI. Idaho County adopted this philosophy: “The wildland-urban interface refers to areas where wildland vegetation meets urban developments. These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes that lead directly to a risk to urban developments.” In addition, the County identified the protection of structures and private property and protection of “the biological resources of the management area” as concerns (Idaho County 2009).

The Nez Perce National Forest Plan direction requires fire suppression (control, contain, confine) in about 70% of the drainage. Fires for resource benefit could be allowed to burn in the Clear Creek Roadless Area, the upper South Fork, and a portion of the West Fork of Clear Creek if sufficient fuel modifications are implemented.

3.3.5.2 Vegetation and Fuels

A distinct moisture gradient occurs from west to east in the project area; this gradient is reflected in the range of habitat types in the area. The western portion of the drainage contains drier habitats that begin with bunchgrasses (which do not support trees) and move into the dry ponderosa pine /Douglas-fir /ninebark habitat types. Historically, fire played an important role in maintaining these habitat types, with low-severity fires occurring every 5–50 years and severe-intensity fire occurring every 90–200 years. Patch sizes ranged from 50 to 1,500 acres. Current patch sizes created by timber harvest range from 6 to 282 acres. Moving east, the habitats quickly transition to moister types dominated by grand fir and western redcedar. Historically, these habitat types were dominated by mixed species with sizable representation of white pine and western larch. White pine and western larch are long-lived tree species typically established after major forms of disturbance (fire windthrow) and have the potential to occupy a site for 200–300 years. Patch sizes for these

species ranged from 40 to 1,000 acres historically. Current patch sizes range from 1 acre to 282 acres. The last habitat types found in the drainage are the cooler habitat types located in the headwaters of Clear Creek. These are dominated by subalpine fir and lodgepole pine and typically have stand-replacing disturbances every 90–150 years. Historically, patch sizes ranged from 40 to 1,000 acres. Current patch sizes range from 1 acre to 282 acres.

Barriers to large fire spread are limited in the project area. A compilation of studies has shown that recent regeneration units or fresh fire scars are effective at stopping crown fires or reducing their effects if they are over 400 feet wide (Hudack et al. 2011).

3.3.5.3 Fire Regime and Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but includes aboriginal burning (Agee 1993). Coarse-scale definitions for natural (historical) fire regimes were developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The 5 natural fire regime classifications are based on the average number of years between fires (fire frequency) and the severity (amount of replacement) of the fire on the dominant overstory vegetation. Historically, the drier mixed-conifer sites best fit a Fire Regime I, while the wetter sites best fit a Fire Regime III. However, with the unnatural effects of fire suppression, the drier sites are trending toward a Fire Regime II due to increases in ladder fuels; these conditions would increase fire severity. The same is occurring in the wetter sites, which are trending toward Fire Regime IV.

Fire behavior effects and other associated disturbances for the low-departure class (FRCC 1) are similar to those that occurred prior to fire exclusion and other vegetative management activities. Ecosystems with a moderate departure from historic rates (33%–66%) have an increased risk of the loss of species composition, structural stage, and canopy closure from noncharacteristic fire. Class 3 ecosystems with a high departure from historic rates (>66%) feature vegetative composition and fuel characteristics that are highly altered from the natural regime; in these ecosystems, the risk of loss of key components is high.

The FRCC in the project area, based on the vegetation attributes, is moderate (FRCC 2), with ranges from 41% in the West Fork drainage, 47% in the upper Clear Creek drainage, and 53% in the South Fork drainage. The overall FRCC, using the LANDFIRE/Vegetation Response Units (VRU) crosswalk and incorporating the fire frequency, yields a score of 39%, or a rating of moderate. A moderate rating means that the fire cycle is trending away from its natural ranges and is being affected by fire suppression or other land management activities. Over time, the drainage will trend toward the high-departure class. Estimates indicate that the area will move from moderate departure to high departure within 30 years if no disturbances occur, because the majority of the area will fall outside of the fire return interval of 30–100 years.

Surface fuel loadings (downed wood) are increasing due to ongoing tree mortality and fire suppression. The benefits to soil productivity increase as more downed wood decomposes; therefore, more nutrients are available for plant growth. Ladder fuels are also increasing due to understory tree growth. Larger amounts of surface and ladder fuels increase the risk of high-severity, stand-replacing fire. This type of fire could lead to reduced soil productivity and moisture-holding capacity.

From a fuels perspective, the vegetation includes little variation. Variations in vegetation patterns create barriers that can slow a fire or alter its behavior (such as dropping the fire from the crowns to the ground). Existing areas of past harvest and other vegetation types, such as shrubfields, could act as barriers; however, they are too small to affect fire behavior at the landscape scale.

3.3.5.4 Potential Fire Behavior

Fire type (e.g., surface and crown) was modeled for the project area for extreme (97th-percentile) weather conditions for visual display. The percent of fire type was quantified for the actual treatment units, and all crown fire activity (active, passive, or conditional) was grouped. Currently, 51% of the project area is susceptible to crown fire.

3.3.6 Environmental Consequences

3.3.6.1 Direct and Indirect Effects

As noted above, the analysis area for direct and indirect effects of the alternatives is the project area.

3.3.6.1.1 Alternative A—No Action

Under this alternative, no treatments are planned; therefore, fuels would persist as discussed under the existing condition and accumulate further over time.

Alternative A would cause no direct effects to fire type or FRCC rating, because no vegetation treatment would take place under this alternative. The indirect effect would be the trending of the landscape toward a FRCC 3 rating within 30 years. There would continue to be a lack of stands of young trees as existing stands continue on with succession. The landscape would also continue to trend toward to a more uniform forest dominated by non-early seral species. Canopy base height would remain low, crown bulk density would remain high, tree density would remain high, and the surface fuels would remain the same. The amount of the project area that could experience crown fire would increase as time passes. Therefore, direct control would be difficult, fires would be large, and costs would be high. Barriers to large fire spread would remain minimal.

Direct Effects: If Alternative A is selected, 51% of the proposed treatment area would continue to be susceptible to crown fire in 2022.

FRCC remains in a moderate category at 39%. The patch sizes associated with these types of landscapes remain below desired conditions.

Indirect Effects: Factors favoring crown fire remain and increase over time. The project area becomes less diverse. Barriers to fire remain low, fire containment opportunities are limited, and fire size and costs are expected to increase. The landscape will trend toward a homogeneous forest dominated by large nonseral trees as the remaining smaller, younger patches continue with succession. No biomass removal opportunities or smoke emissions from logging slash will occur.

3.3.6.1.2 Alternatives B, C, and D

Direct Effects

The direct effect of these alternatives is a reduction in potential crown fire acreage, a slight improvement in FRCC, and a marked improvement in patch size. Potential crown fire area is reduced by 7% in all alternatives, moving the area from 51% to 44% by the year 2022. The regeneration treatments would influence FRCC ratings by changing seral classes from mature to young stands. However, approximately 50% of current early seral patches change seral class within 10 years, so the effect of the regeneration treatments is lessened. The project area remains at a FRCC 2 rating even after treatments, due to relatively low amounts of proposed regeneration harvest. Alternatives B, C, and D regenerate 6%, 10%, and 5% of the project area respectively. All the action alternatives use prescribed fire on up to 3% of the area. Alternatives B and D reduce the overall landscape departure rating from 39% to 38%, and Alternative C reduces it to 37%, which is a slight improvement on the landscape but still maintains the area in the moderate category.

Patch size increases across all action alternatives (Table 3-4), driven by the varying amount of regeneration harvest. Mean patch sizes are not as large as historically occurred; however, the trend is positive. Given the distribution across the landscape, these patches emulate a mixed-severity fire regime. Treatment units range in size, which is important to landscape and fuel variability. Discontinuities in surface, ladder, and crown fuels interrupt fire spread, but relatively small patches may not have a substantial effect on large fires. Treatments of individual stands under a given prescription would probably be irrelevant to fire behavior and effects at the landscape scale, because wildfires are often larger than individual treatment units (Finney and Cohen 2003). Many of the treatments in the proposed action span several stands and therefore should be large enough to affect a large fire. Canopy base heights would be raised, crown bulk density would be substantially lowered, tree density would be decreased, and surface fuels would be treated, all of which would lower fire intensity in the treatment units. Direct control options in the event of a fire would increase across the landscape as the fuel profile is interrupted, which should reduce fire size and cost.

All the action alternatives affect similar acreage, and the reduction in acreage susceptible to crown fire is the same for each alternative: 7%. Acreage susceptible to crown fire will drop from the current 51% to 44% by 2022.

Table 3-4. Percent of analysis area by structural class and mean patch size by alternative

Structural Class	Alternative A (Existing)		Alternative B		Alternative C		Alternative D	
	Percent of Analysis Area	Existing Mean Patch Size	Percent of Analysis Area	Mean Patch Size	Percent of Analysis Area	Mean Patch Size	Percent of Analysis Area	Mean Patch Size
Seral Shrub	7	41	6	252	6	252	6	252
Stand Initiation	17	17	25	96	26	104	25	91
Stem Exclusion	26	13	20	131	20	119	21	128
Understory Reinitiation	17	23	20	83	18	83	18	83
Young Multistory	3	20	2	26	2	904	2	26
Old Single-Story	17	20	16	116	17	121	16	116
Old Multistory	13	34	11	81	11	72	11	81

Individual and total FRCC stratum departures change very little; the differences are primarily driven by the amount of regeneration harvest in each alternative, which changes size classes from mature classes to young seral classes. The overall FRCC remains a 2 across all alternatives (Table 3-5).

Table 3-5. Landscape fire regime condition class stratum departure, by alternative

Stratum (Vegetation Response Units)	Stratum Comp %	Alternative A (No Action) Stratum Departure	Alternative B Stratum Departure	Alternative C Stratum Departure	Alternative D Stratum Departure
3	7	70	70	70	70
8	29	48	47	43	48
10	12	49	49	49	49
17 & 7	52	33	31	31	31
Landscape Departure		39	38	37	38
Landscape Fire Regime Condition Class		2	2	2	2

Indirect Effects

The main indirect effects from the action alternatives result from the tree residue generated from harvest. Slash treatments would either result in biomass to be hauled away or piles to be burned. Biomass is measured in dry tons; smoke production in particulate matter (PM_{10} and $PM_{2.5}$) is measured in pounds. Table 3-6 and Table 3-7 show the amounts of biomass and smoke produced as a result of the action alternatives.

Table 3-6. Tons of biomass generated from harvest activities, by alternative

Activity	Alternative B	Alternative C	Alternative D
	Total Biomass - Tops/Limbs	Total Biomass - Tops/Limbs	Total Biomass - Tops/Limbs
Variable Retention	22,100	30,384	16,177
Commercial Thin	31,244	21,193	25,818
TOTAL	53,344	51,577	41,995

Table 3-7. Pounds of PM_{10} and $PM_{2.5}$ generated from harvest activities, by alternative

Activity	Alternative B		Alternative C		Alternative D	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Variable Retention	308,295	268,515	470,952	410,184	250,744	218,390
Commercial Thin	435,860	379,620	328,492	286,106	400,179	348,543
Prescribed Burning	2,296,916	1,991,682	3,257,048	2,706,396	2,090,560	1,737,120
TOTAL	3,041,071	2,639,817	4,056,492	3,402,686	2,741,483	2,304,053

3.3.6.2 Cumulative Effects

The cumulative effects geographic boundary for fuels is the project area because project activities would have localized effects on fuels and fuel continuity, which influences the FRCC. The amount and arrangement of fuels directly affects fire type. The project area is sufficient to display effects. The time frame for cumulative effects is 10 years.

The only activities considered for cumulative effects to fuels are management activities that may increase or decrease fuels over the next 10 years. The only activity considered for cumulative effects is fire suppression/exclusion. No current activities and no foreseeable future activities would affect fuels in the cumulative effects area.

Fire suppression has been effective in the project area for nearly 100 years. The incremental effect of suppressing each small fire in the watershed has promoted late seral species (rather than early seral species) and changed the forest structure, which in turn has changed the way the forest responds to fires.

3.3.6.2.1 Alternative A—No Action

When combined with fire suppression, this alternative would cause a cumulative effect. Fire exclusion has created the current condition of contiguous fuels. Crown fire potential would continue to increase across the project area without treatments, FRCC ratings would move to the higher end of the moderate category in 10 years, and patch size would not be changed, which could affect future fire behavior.

3.3.6.2.2 Alternatives B, C, and D

A minor positive cumulative effect would be associated with the action alternatives. Fuel modifications across the landscape and in key locations along the Forest boundary could allow for natural ignitions to burn freely in portions of the project area. Fire suppression

would continue on lands managed for timber; however, treatments would reduce fuels, help to improve FRCC ratings, and reduce crown fire potential in these areas.

3.4 ROADLESS AREAS

The purpose of this analysis of the Idaho Roadless Areas and unroaded resource is to disclose the project's potential effects to roadless and wilderness attributes and determine whether it might affect future consideration for wilderness recommendations. This analysis focuses on the potential effects of project activities on wilderness characteristics as defined in the FSH 1909.12 (72.1). The analysis for the effects on other roadless resource attributes such as water resources, soils, and wildlife habitat can be found in other sections of this EIS. The 2008 Idaho Roadless Rule (36 CFR 294 subpart C) integrated local management concerns and the need to protect these areas in concert with the national objectives for protecting roadless area values and characteristics.

The final Idaho Roadless Area rule designated 250 Idaho Roadless Areas and established 5 management themes, which include Wild Land Recreation, Special Areas of Historical and Tribal Significance, Primitive, Backcountry Restoration, and General Forest, Rangeland, Grassland. Allocation of an area to a specific theme does not mandate or direct the Forest Service to propose or implement any action in that area; however, management theme designations do determine permitted and prohibited activities. Certain activities, such as road building, mineral development, and timber cutting, are permitted in some themes and prohibited in others; other activities, such as motorized travel, grazing, and motorized and mechanized use, are not changed by this rule. Nez Perce National Forest Plan management direction states that roadless areas will not be managed for wilderness.

The term "roadless area" refers to an area of at least 5,000 acres that does not have developed and maintained roads and is substantially natural in condition. A roadless area is specifically defined as an area that meets the minimum criteria for wilderness. Unroaded lands have natural characteristics similar to those of roadless areas but occupy less acreage. Wilderness characteristics include natural integrity, undeveloped characteristics, outstanding opportunities for solitude and primitive unconfined recreation, special features and values, and manageability. The purpose of this analysis is to evaluate the environmental consequences of the proposed alternatives on the wilderness characteristics of the Clear Creek Roadless Area.

3.4.1 Analysis Area

The analysis area is the 9,200-acre Clear Creek Roadless Area. The Clear Creek Roadless Area is designated as a *backcountry restoration* theme under the 2008 Idaho Roadless Rule.

The Clear Creek Roadless Area is located at the head of Clear Creek along the western boundary of the Nez Perce National Forest. Private property adjoins this area on the northwestern boundary. The nearest roads are spurs of Road 1842 on the north, Road 650 on the west, and Road 286 on the east, but some of these roads are closed during the general hunting season to mitigate impacts on big game.

Elevation ranges from 2,000 feet on Clear Creek at the forest boundary to 4,600 feet at China Point Ridge and the headwaters of Solo and Kay creeks. Topography is mountainous with steep slopes (commonly over 70%) paralleling the drainages. Ridgetops are relatively flat.

The Clear Creek drainage has been a significant part of the Nez Perce Forest timber sale program since the late 1950s. Most of the acreage remaining in the Clear Creek Roadless Area has burned twice, once in 1870 and again in 1931, leaving about 7,000 acres covered with brushfields in the South Fork and Middle Fork drainages of Clear Creek. Previous conifer forests have never reestablished themselves.

Vegetation in the area ranges from very moist, warm cedar habitat types to drier, warm Douglas-fir habitat types. Shrub coverage in the brushfields is primarily maple, willow, serviceberry, and various other shrubs. Bordering the brushfields are patches of young (approximately 70-year-old) timber, a mix of grand fir, Douglas-fir, and western redcedar. Understories are sparse but contain a variety of moist-site plants. Some natural meadows exist in upper Kay Creek in Section 28.

The brushfields have been important big game (elk and moose) winter range, but the preferred browse species—redstem, willow, mountain maple, and serviceberry— have in recent years grown out of reach of the animals. Prescribed fire has been used in an attempt to increase the value of the range. Current uses of the area include livestock grazing, big game winter and summer range, fishing, hunting, and mining.

3.4.2 Resource Indicators

Issue: A commenter expressed concern that the impacts on the Roadless Area must be evaluated in relation to its designation as proposed Wilderness in House Resolution (H.R.) 3334.

Indicator: Wilderness values, impacts of the project on future wilderness designations

The following resource indicators were used to compare the effect of the alternatives:

Natural Integrity—The extent to which long-term ecological processes are intact and operating

Undeveloped characteristics—The degree to which developments and uses are apparent to most visitors

Outstanding opportunities for solitude or primitive unconfined recreation—Solitude is a personal, subjective value defined as the isolation from sights, sounds, and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its terms, without the comfort and convenience of facilities.

Special features and values—Unique ecological, geographical, scenic, and historical features of an area

Manageability—The ability to manage an area for wilderness consideration and maintain wilderness attributes

3.4.3 Affected Environment

Natural Integrity—Past wildfires in the Clear Creek area and the resulting vegetative succession are some of the natural processes that have occurred. The landscape is prone to fire, and numerous natural ignitions occur every year. Fire management strategies for the area dictate full suppression, however, due to the Roadless Area's proximity to private

property and location within a Community Protection Zone. Opportunities for management of naturally occurring wildfire are limited.

Undeveloped Characteristics—Past road building and timber harvest along the southern and eastern portions of the Roadless Area are readily apparent. The private property interface on the westernmost boundaries is highly segmented with numerous corners. The area has several grazing permits, and cows are a common occurrence.

Special Features and Values—No special features or values have been identified for the Clear Creek Roadless Area.

Opportunities for Solitude and Primitive Unconfined Recreation—This small area, with nearby logging activity, offers limited opportunity for solitude. Vegetative screening is high, however. The main opportunities here are bushwhacking and following game trails through dense brushfields.

Manageability—This area has been reduced by at least 14,800 acres since 1979, almost entirely because of timber sales. The area boundary is imprecise except where it coincides with the forest boundary. The area boundary has been drawn to exclude existing roads from the remainder of the area.

3.4.4 Environmental Consequences

3.4.4.1 Direct and Indirect Effects

3.4.4.1.1 Alternative A

No activities are proposed under Alternative A; therefore, under this alternative, the Clear Creek Roadless Area would remain in its current condition. No direct effects would occur to the wilderness characteristics of the area (i.e., the area's natural integrity, undeveloped characteristics, opportunities for solitude or primitive unconfined recreation, or manageability).

Continued fire suppression and lack of disturbance may indirectly cause the area to trend away from desired conditions and may affect the natural quality of the area over time. Shrubfields would continue to become decadent and would be unusable by wintering wildlife. Timber stands could become more susceptible to large-scale stand-replacing wildfire because mosaic conditions would not exist on the landscape.

3.4.4.1.2 Alternatives B, C, and D

Alternatives B, C, and D would implement low-mixed severity prescribed fire on approximately 1,400 acres within the Clear Creek Roadless Area over a period of several years. Other activities proposed in Alternatives B, C, and D fall outside the Roadless Area and do not infringe on potential wilderness values; therefore, they are not discussed in this analysis.

Implementation of prescribed fire would likely be accomplished using aerial (helicopter) and hand ignitions. Extensive pumps, hoselays, and hand-constructed control lines would probably be needed to control the fire along the private property interface on the westernmost portion of the Roadless Area.

Natural Integrity—Implementation of the action alternatives would have a ***beneficial effect*** to the natural qualities of the area because disturbance would be sustained, although the mechanism of disturbance would be human caused and not natural. Where prescribed fire coincides with decadent shrubfields, species such as maple, willow, and serviceberry would be rejuvenated and become more available as browse for wintering wildlife. In timbered areas, the mixed-severity mosaic caused by burn would create patches of early successional forest that would ensure a balanced range of age classes distributed across the Clear Creek watershed.

Undeveloped Characteristics—Implementing Alternatives B, C, or D would cause ***little effect*** to the undeveloped characteristics of the Roadless Area. Low- to mixed-severity prescribed fire closely emulates the effects of wildfire under a wide range of climate and environmental conditions. Visitors would not likely be able to distinguish whether the fire was human caused or natural. A site-specific burn plan would be developed for the project and would document the desired effects and the environmental variables necessary for implementing the prescribed fire to meet objectives.

Handline construction along the private property interface may temporarily alter the undeveloped characteristics of the Roadless Area, although property/boundary line location and establishment—including limbed trees and painted boundaries—has already altered this area. Fuels along the boundary are generally light and include open ponderosa pine, shrubs, and harvested private grounds. Handline construction (including limbing trees, removing brush, and light ground scalping in combination with pumps and hoselays to control the burn) is expected to be minimal. Rehabilitation of the handlines following implementation would further reduce the evidence of development, and no evidence is expected to be visible several years after rehabilitation.

Special Features or Values—Since no special features or values have been identified for the Clear Creek Roadless Area, implementing Alternatives B, C, or D would cause ***no effect*** to this category of wilderness characteristics.

Opportunities for Solitude and Primitive Unconfined Recreation—Opportunities for solitude and primitive unconfined recreation would be ***temporarily affected*** during implementation of the prescribed fire. Trails 130 and 728 would likely be temporarily closed to allow for safe implementation of the burn. During ignition, sights and sounds of helicopters would likely be heard throughout the Roadless Area, although these disturbances would be expected to last only a short time. Crews operating pumps, hoses, and chainsaws would have less effect on solitude and unconfined recreation, since their activities would be confined to a small area immediately adjacent to the private property boundary in the westernmost portion of the Roadless Area.

After implementation, the opportunities for solitude and primitive unconfined recreation would remain unchanged from their current state.

Manageability—*No effect* to the manageability of the Roadless Area would result from implementation of Alternatives B, C, or D. None of the activities proposed in any of these alternatives would have an effect on the current or future location of the Roadless Area boundary.

3.4.4.2 Cumulative Effects

The cumulative effects boundary for this analysis is the Clear Creek Roadless Area. This boundary was selected because roadless areas are generally the pool from which future wilderness designations occur. The Clear Creek Roadless Area was proposed for wilderness designation in H.R. 3334, the *Northern Rockies Ecosystem Protection Act*.

A forward-looking timeline to measure cumulative effects is difficult to establish, as wilderness designations can be a lengthy political process. However, if the area were designated as Wilderness, it might reasonably be expected to receive higher than ordinary use, given its close proximity to towns and relative ease of access.

As pointed out above, the Clear Creek Roadless Area has shrunk by almost 15,000 acres since 1979 as a result of timber sales. The current Roadless Area boundary is imprecise and drawn to exclude timber sale areas. With the exception of prescribed fire, none of the activities proposed in Alternatives B, C, or D would affect, alter, or infringe upon the current Roadless Area boundary or have an effect on the wilderness values inside the Roadless Area.

Management of naturally occurring wildfire to benefit resources in this Roadless Area is not likely to be pursued or promoted in future land management planning, due to the area's close proximity to private lands and managed timberlands. Fire suppression is likely to continue. The prescribed fire proposed within the Clear Creek Roadless Area would sustain disturbance in a disturbance-dependent landscape, resulting in a beneficial cumulative effect to the natural qualities of the area.

Because the implementation of Alternatives B, C, or D will have no effect, limited temporary effects, or beneficial effects to the wilderness characteristics of the area, the project will not alter the area's potential to be considered for future wilderness designation.

3.5 SOILS

This report summarizes the effects of the alternatives on the soils resource. This section was summarized from the "Clear Creek Integrated Restoration Project Soils Report," located in the project record.

3.5.1 Analysis Area

The areas assessed for soils concerns are the individual treatment units (variable acres) and associated skid trails, landings, and temporary roads within the 43,700-acre project area.

3.5.2 Regulatory Framework

Forest Plan direction and the following federal and State laws and regulations pertaining to the management of soil resources would be applied to the project:

- FSM 2500 Watershed and Air Management – Washington Office (WO) Amendments 2500-2010-1 and 2500-2010-2 and Northern Region (R1) Supplement 2500-99-1 (Regional Soil Quality Standards)
- Soil and Water Conservation Practices (SWCPs) Handbook - FSH 2509.22
- Idaho Forestry BMPs
- Idaho Forest Practices Act (1974)

- National Forest Management Act of 1976 (NFMA)

3.5.2.1 Nez Perce Forest Plan

3.5.2.1.1 Forest Plan Amendment

The Forest Plan (USDA Forest Service 1987b) determined that for any project, soil productivity will have been maintained and any irreversible impacts to the soil resource will have been minimized (USDA Forest Service 1987b, p. II-2, Goal 18).

Forest Plan Soil Quality Standard #2 (II-22) would be amended for Alternatives B, C, and D. This site-specific amendment for lands within the project area would replace the Forest Plan standard of 20% DSD with the Region 1 Soil Quality Standards listed below. The amendment would allow the project to proceed with the treatment of 3 units that currently exceed the 20% standard; in addition, the amendment would allow for the implementation of soil improvement activities.

Region 1 Soil Quality Standards (FSM 2500 Supplement 2500-99-1) specify that at least 85% of an Activity Area (defined as a land area affected by a management activity) must have soil that is in satisfactory condition. In other words, detrimental impacts (including past management impacts) must affect <15% of an Activity Area. In areas where <15% detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15%. Where detrimental soil conditions from past activities affect more than 15% of the Activity Area, the cumulative DSD from project implementation and past activities shall not exceed the conditions prior to the planned activity and shall provide a net improvement in soil quality.

3.5.2.1.2 Consistency with Forest Plan and Environmental Law

The Clear Creek project was designed to meet the standards set forth in the Idaho Forest Practices Act, FSM 2500—Watershed and Air Management and Northern Region (R1) Supplement 2500-99-1 (Regional Soil Quality Standards), and the FSH of SWCP (FSH 2509.22).

The project complies with NFMA 16 USC 1604(g)(3)(E)(i), which states “Soil, slope or other watershed conditions will not be irreversibly damaged.”

Nez Perce Forest Plan standards listed on page II-22 of the Plan would also be met, including the Forest Plan amendment for the project (Table 3-8).

Table 3-8. Forest Plan compliance

Standard Number	Subject Summary	Compliance Achieved By
1	Evaluate the potential for soil displacement, compaction, puddling, mass wasting, and surface soil erosion from ground-disturbing activities	Landtype identification and evaluation Field surveys using Regional standards were conducted on each of the proposed Activity Areas (units)
2	A minimum of 85% of an Activity Area shall not be detrimentally compacted, displaced, or puddled upon completion of activities	Post-project monitoring to verify compliance and to assess if additional mitigation is needed Soil improvement activities on areas with prior impacts to achieve a net improvement in soil productivity
3	Maintain sufficient ground cover to minimize rill erosion and sloughing on road cut and fill slopes and sheet erosion on other Activity Areas	Project design features were developed to minimize erosion. Temporary road locations were evaluated in the field. Unit-specific design measures were developed for high subsurface erosion areas.
Forest Plan Amendment (incorporates R1 soil standard)	Where detrimental soil conditions from past activities affect more than 15% of the Activity Area, the cumulative detrimental soil disturbance from project implementation and past activities shall not exceed the conditions prior to the planned activity and shall provide a net improvement in soil quality	Soil improvement activities on areas with prior impacts to achieve a net improvement in soil productivity Post-project monitoring to verify compliance and to assess if additional mitigation is needed

3.5.3 Resource Indicators

Soil Stability and Erosion Hazard Potential—Soil erosion can result in loss of soil productivity due to surface soils moving downslope and thus removing the materials with the greatest ability to hold moisture and nutrients. Compared to the subsurface soils, surface soils in the project area contain more organic matter and have a higher volcanic ash-derived mineral content. Removal of vegetation and/or ground disturbance associated with timber harvest or fire can increase erosion on certain landtypes.

Indicator: Acres of proposed harvest activity and miles of proposed temporary roads on landtypes with a high subsurface erosion hazard

Soil Productivity—Past management activities in the project area have caused DSD (e.g., compaction, displacement, erosion, loss of organic matter) and decreased soil productivity. According to the Region 1 Soil Quality Standards, detrimental disturbance from management activities should not exceed 15% of an Activity Area and coarse woody material retention should be appropriate to the habitat type. In areas that exceed 15% detrimental disturbance, the combined detrimental disturbance effects of the current project (implementation and restoration) should not exceed the disturbance levels present before the activity, and activities should be directed toward a net improvement in soil quality.

Indicator: Number of commercial harvest units requiring specialized project design measures to meet Regional soil standards

3.5.4 Analysis Methodology

Reports and maps, aerial photos, and field reviews generated by GIS were used to analyze effects to the soil resource from the project's proposed activities. Field sampled vegetation

database (FSVeg) queries were conducted to identify past harvest activities and their time frames (see project file). All proposed harvest units were examined in the field to assess past management impacts and to evaluate potential effects to soils. Surveys following protocols outlined in the Region 1 Approach to Soils NEPA Analysis Regarding Detrimental Soil Disturbance in Forested Areas (USDA Forest Service 2009b) were conducted to determine the percentage of DSD in each of the proposed harvest units (Activity Areas). An erosion hazard assessment was used to summarize erosional characteristics based on landtype properties. This assessment described overall erosion hazards in the project area and at the unit scale to aid in the development of project design measures.

Potential soil restoration opportunities throughout the project area were assessed, with a focus on old skid trails, landings, and roads. Project design features describe methods for minimizing impacts to the soil and techniques for restoring soil biophysical integrity.

3.5.4.1 Data Assumption and Limitations

This methodology provides a conservative assessment of existing soil conditions (Page-Dumroese et al. 2006a), given its inherent assumptions (ocular data and soil pits).

Informal comparisons found that both for single observers and between observers, category calls in this methodology have a variability of 5%. This level of survey leads to a 90%–95% confidence with error bars from 5% to 8%, depending on the amount of disturbance found. The surveys achieve statistical inference for units with either low disturbance (<7%) or moderately high disturbance (>23%) (Page-Dumroese et al. 2009).

Field soil survey methodology based on visual observations can produce variable results among observers, and the confidence of results is dependent on the number of observations made in an area (Page-Dumroese et al. 2006a). The existing and estimated values for DSD are not absolute and are best used to describe the existing soil condition. The calculation of the percentage of additional DSD from a given activity is an estimate, since DSD is a combination of such factors as existing ground cover, soil texture, timing of operations, equipment used, skill of the equipment operator, the amount of wood to be removed, and sale administration. The DSD estimates for proposed project activities are mostly based on local monitoring and research results (Archer 2008; Reeves et al. 2011). The DSD estimates of proposed activities also assume that BMPs would be implemented and that soil recovery occurs over time.

3.5.4.2 Scientific Uncertainty and Controversy

Site and soil productivity relies on complex chemical, physical, and climatic factors that interact within a biological framework. For any given site and soil, a change in a key soil variable (e.g., bulk density, soil loss, and nutrient availability) can lead to changes in potential soil productivity. Defining the threshold at which productivity is detrimentally disturbed is controversial. The rationale for the 15% limit of change in soil bulk density was largely based on the collective judgment of soil researchers, academics, and field practitioners, and the accepted inability to detect changes in productivity less than 15% using current monitoring methods (Powers 1990). Powers (1990) states that the soil quality guidelines are set to detect a decline in potential productivity of at least 15%. This statement does not mean that the Forest Service tolerates productivity declines at this level, but that it recognizes problems with detection limits.

Soil quality standards are being studied by a cooperative research project called the North American Long-Term Soil Productivity Study (LTSP). The 5- and 10-year results were recently published (Page-Dumroese et al. 2006b; Fleming et al. 2006; Sanchez et al. 2006). The LTSP study is ongoing and provides the best available science to resource professionals. In a 10-year study, no observed reduction in tree growth occurred as a result of compaction or organic matter removal in plots with soils generally similar to those found in the project area (silt loam) (Powers et al. 2005). These results are relatively short-term and involve many site- and soil-specific factors. Future results from the ongoing study should be helpful for assessing harvest practices on soil productivity.

Additional controversy surrounds the use of the term "irreversible" in the NFMA. The NFMA has guidelines that "insure that timber will be harvested from NFS lands only where soil, slope, or other watershed conditions will not be irreversibly damaged." The DSD described in this analysis does not necessarily result in substantial and permanent impairment.

DSD is reversible if the processes (organic matter accumulation, moisture, topsoil retention, and soil biota) are in place and if time is allowed for recovery. Irreversible damage to soils in the project area could result from the loss of the volcanic ash cap through erosion or removal by excavation for temporary roads and/or skid trails. Soil recovery could still occur in remaining subsurface soils, yet the exceptionally high porosity and water-holding properties of the Mazama ash cap would likely be irrecoverable.

3.5.5 Affected Environment

3.5.5.1 Landforms and Geology

Soil characteristics in the project area vary according to slope gradient, slope aspect, parent material, texture, depth, vegetative cover, and microclimate. Landforms in the project area are mostly dissected mountain slopes (58%) and low- and moderate-relief rolling uplands (33%).

The geologic substrate is primarily Belt Zone metamorphics (45%), followed by Idaho Batholith granitics (35%) and Columbia River basalt (15%). Soil parent material is primarily granitic (85%), with inclusions of basalt (8%) and sedimentary rock (3%). Surface soils are generally silty or sandy loams. The coarse fragment content in the soils is very low, generally between 5% and 10%, increasing the susceptibility of the soil to compaction and rutting from ground-based machine harvesting. More than half of the ground cover is litter; approximately 35% of the units have vegetative cover, and only 2% have bare soil.

Much of the area is overlain by a mixed to intact layer of Mazama volcanic ash, ranging from 7 to 20 inches in thickness. The ash cap is thin or missing in the steeper breaklands. Ash material is physically highly favorable to root growth, being very permeable and possessing a high ability to hold moisture and nutrients. Its presence as an intact layer with little mixing is an indication of relatively stable slopes over the past 6,700 years since the ash deposition.

3.5.5.2 Landslide and Erosion Hazard Potential

Landtypes are ecological land units categorized by similarities in soils, landforms, geologic substrate, geomorphic processes, and plant associations (Cleland et al. 1997). These land units have been mapped for the entire Nez Perce National Forest. Landtypes were identified

for the project area to help focus field evaluations and to pinpoint any erosion hazard concerns.

Landslide-prone (LSP) areas mapped on the Nez Perce National Forest are located on slopes over 60% and landtypes 50EUU and 50CUU. Areas considered highly prone to landslides comprise approximately 11% of the project area.

3.5.5.3 Soil Productivity

Soils in the project area are generally silt loams, formed from loess and overlain with a moderately deep volcanic ash layer. Past natural and management activities have impacted the productivity of these soils.

During the summer of 2012, field surveys were conducted on each of the proposed harvest and burn units to assess the extent of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movements. Existing detrimental soil conditions within the units range from 0% to 22% (see project file). Soil disturbances found during the surveys included old benched roads, skid trails, dozer piling, soil displacement, rutting, and compaction. Three units exceed the 20% Forest Plan Standard; therefore, a Forest Plan amendment is needed to proceed with project activities, and the soil must be improved t so the units will be trending positive. The project area also includes 19 units that are currently over the 15% Regional Soil Quality Standard.

Although not specifically addressed by a Forest Plan standard, the presence of above-ground organic matter or woody material is an important component of soil health. The retention of coarse (>3 inches in diameter) woody material is essential to maintaining soil productivity (Graham et al. 1994). Regional direction (Forest Service Manual) for organic material recommends following guidelines such as those contained in Graham et al. (1994) if more-specific local guidelines have not been developed. Graham et al. (1994) recommend 7–33 tons/acre of coarse woody material (depending on habitat type, moisture regime, and aspect). This amount should provide sufficient nutrients and organic material for soil productivity in the long term (100–300 years). Retaining existing coarse wood levels and allowing for recruitment through the natural addition of snags and/or standing trees would facilitate these benefits. Existing down woody material ranged between 0 and 43 tons/acre in units proposed for project activities, with an average of 11 tons/acre (visual observation). Litter and duff layers throughout the project area average 6 centimeters in depth.

3.5.5.4 Effectiveness of Design Features

Past monitoring and research indicate that the effectiveness of the project design features would be moderate to high (Froehlich and McNabb 1983; Graham et al. 1994; Graham et al. 1999; Korband Covington 2004; Neary et al. 2008; Curran et al. 2005a, b).

3.5.6 Environmental Consequences

The spatial scope for direct, indirect, and cumulative effects is the individual commercial units (variable acres) and associated temporary roads. The temporal scope for direct and indirect effects is several decades (30–50 years), covering both pre- and post-project activities. The only activities analyzed in detail are commercial harvest units and associated temporary road construction and prescribed burning.

3.5.6.1 Activities Not Analyzed in Detail

Precommercial thinning: The project includes 1,890 acres of proposed precommercial thinning activities. Because precommercial thinning only utilizes hand tools and no ground-based mechanized equipment, this activity would not increase DSD in the project area. Precommercial thinning units were not surveyed.

Road Maintenance and Reconstruction: Forest system roads are not considered in the determination of potential DSD (FSH 2509.18). Approximately 120 miles of road maintenance and reconstruction is proposed under Alternatives B, C, and D and would improve road drainage and reduce the risk of mass erosion.

Road Decommissioning: Forest system roads are not considered in the determination of potential DSD (FSH 2509.18). Approximately 13.8 miles (55 acres) of road would be decommissioned. Road decommissioning would directly improve soil conditions by decompacting soils and adding coarse woody material and other organic matter to the existing road surface. Road decommissioning would also improve slope stability and reduce the potential risk of mass erosion from culvert failure. Under Alternative A, no road decommissioning activities would occur. Soils in these areas would remain in an unproductive condition.

Restoration: Approximately 41 acres of grassland restoration is proposed. This grassland area will undergo prescribed burning and will be revegetated with native grasses and forbs. No erosion or DSD is expected.

3.5.6.2 Activities Analyzed in Detail

Commercial harvest and associated temporary road construction and prescribed burning are analyzed in detail, as these activities can contribute to detrimental disturbance calculations, cause erosion, and affect soil productivity.

Commercial Harvest: Alternative B proposes 8,550 acres of commercial harvest within 143 units. Alternative C proposes 8,700 acres in 145 units, and Alternative D proposes 7,530 acres in 130 units. Harvest treatments include regeneration, improvement, and commercial thinning. Both skyline yarding and ground-based skidding systems would be used to remove trees. Activity-generated slash piled along roadsides and in landings would be dispatched via sale of biomass materials, chipping, or burning. Slash within the units would be left in place or treated using prescribed burning, mastication, or machine piling and burning.

Temporary Road Construction: In Alternatives B and C, approximately 36 miles of temporary roads would be constructed. Of these miles, 8.5 miles would be located on existing road templates. Alternative D proposes 18 miles of temporary roads, of which 9 miles already exist. Disturbed width for temporary roads would average 25 feet. Temporary roads would be located on low-gradient, dry ridges or upper slopes and away from water; these roads would have no stream crossings.

Temporary roads are considered 100% detrimental disturbance with reduced soil productivity until vegetation, organic matter, and hydrologic function are restored. The greater disturbance associated with temporary road construction is the displacement or mixing of the topsoil, including the Mazama ash cap, during road excavation. Temporary roads would be constructed, used, and decommissioned within 1–5 years. Road decommissioning following

use would promote restoration of soil structure, water infiltration, aeration, root penetrability, and soil biological activity, as observed with road decommissioning techniques used on the Nez Perce and Clearwater National Forests. These techniques would support recovery of productivity on soils disturbed by temporary roads.

Prescribed Burning: Low- and mixed-severity prescribed fire is proposed on 1,370 acres in 15 units for all action alternatives. Within the proposed units, approximately 465 acres are mapped as LSP and/or susceptible to mass wasting. A design feature of no ignition in these areas (following PACFISH guidelines) would be implemented. Fire would be allowed to back into these areas.

3.5.6.3 Direct and Indirect Effects

As noted above, the analysis area for direct and indirect effects of the alternatives is the 43,700-acre project area.

3.5.6.3.1 Alternative A—No Action

This alternative maintains the existing condition. Alternative A would not alter the current soil erosion or landslide potential and would retain the same amount of coarse woody material, both standing and down. Existing DSD would persist with very slight natural recovery of surface layers of compacted soils. Over time, large woody debris from dead trees would fall on the ground, increasing organic matter and water-holding capacities on-site. In the absence of catastrophic fires, these trends would exist on most of the project units.

Under Alternative A, no road decommissioning activities would occur that would directly improve soil conditions by decompacting soils and adding coarse woody material and other organic matter to the existing road surface. Soils in these areas would remain in a less productive condition.

3.5.6.3.2 Alternatives B, C, and D

Landslide and Erosion Hazard Potential

The project area has been mapped and divided into landtypes—areas featuring similar soils, hydrology, and vegetation characteristics. Soil erosion and mass wasting are natural processes, and many landtypes across the Forest have high inherent hazards of erosion, mass wasting, and landslides (NRCS 2006). These natural processes have occurred over long time periods and are fundamental factors in creating the present-day landscape.

Landslide-prone (LSP) areas were identified using GIS analysis and verified in the field. For Alternative B, approximately 245 acres of LSP area are located within 21 units. Alternative C has 255 acres within 22 units, and Alternative D had 135 acres in 14 units. These LSP areas would be further delineated in the field during unit layout and would receive a PACFISH buffer. No harvest activities would occur in these areas.

An erosion hazard assessment based on landtype properties was used to determine erosional characteristics of the project units and temporary roads. This assessment was used to develop project design measures to minimize erosion potential. Mass wasting, surface erosion, and subsurface soil erosion potentials were evaluated for the landtypes coinciding within the proposed harvest and burn units. (See project file for detailed information on individual units.)

Surface erosion was low to moderate for all harvest units. Only 16 acres were located on landtypes rated as high for mass wasting, and these acres were located within the same areas as the LSP areas. These acres would be incorporated in the PACFISH buffered areas. Under Alternatives B and C, ground-based logging would occur on approximately 3,080 acres located in areas with high subsurface erosion potential. Under Alternative D, ground-based logging would affect 2,950 acres located in areas with a similar high risk for subsurface erosion. Generally, logging in areas with high risk for subsurface erosion is problematic only if the surface soil is removed and the subsurface and parent material is exposed. Based on past monitoring on the Clearwater Forest, an estimated average 10% of areas using ground-based logging systems are detrimentally disturbed. Using this assumption, approximately 300 acres would be utilized for skid trails and landings.

Landtype erosion hazards used to assess the effects of the alternatives on soil stability and erosion potentials indicate an overall increase of erosion potential for each of the action alternatives. Surface soil loss through displacement and mixing with infertile substrata has long-lasting consequences for soil productivity. This loss occurs during temporary road construction, excavation of skid trails and landings, and displacement of soils during ground-based harvest. Even though the ash layer is not a significant source of soil nutrient content, loss of the ash layer reduces water-holding capacity and high-quality tree rooting material. Since volcanic ash is not easily replaced, these effects may be very long lasting.

Design measures to reduce the potential for subsurface erosion include the following: limiting the amount of excavated skid trails and landings; fully decommissioning all excavated skid trails and landings on these landtypes; and placing large, woody material over the contoured slope for soil stabilization.

For Alternatives B and C, approximately 30 miles of proposed temporary roads are located on landtypes with high subsurface erosion potential. Approximately 8.0 miles occur on already existing road templates. For Alternative D, 15 miles of temporary roads (7.5 miles existing) occur on high subsurface erosion landtypes. Location on these landtypes is often only problematic if the surface soil is removed and the subsurface material is exposed. The proposed temporary roads would be located on ridgetops and upper slopes, and only small portions would require some form of excavation. All temporary roads would be decommissioned after use, and large woody material (>3 inches in diameter) would be placed on the surface to aid in soil stability. Even if small segments in these roads cut into the subsurface material and some erosion does occur, the likelihood of sediment delivery to streams would be minimal, because temporary roads would be located on ridgetops far from stream channels.

Soil Productivity

Compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movements can all reduce site productivity. For the purpose of the project, proposed harvest units, temporary roads, and prescribed burn units are all considered Activity Areas.

Much research has been conducted on the extent of ground disturbance from harvest activities. Disturbance has been shown to range from 4% to over 40%, depending on equipment used, method and season of operation, and silvicultural prescription (Clayton

1981; Clayton 1990; McNeeland Ballard 1992; Tepp 2002). Megahan (1980) documented that the highest amount of disturbance came from tractor yarding, with lesser amounts from skyline and aerial methods. In order to estimate the potential increase in detrimental disturbance created by proposed activities, the following assumptions were made for ground-based skidding, skyline yarding, and temporary road construction:

- Detrimental soil impacts from proposed ground-based skidding are estimated at 8%–12% (average 10%) of an Activity Area based on use of designated skid trails (Archer 2008). Disturbance is generally limited to main skid trails and landings. Soil disturbance can be minimized by using existing skid trails and/or by designating the locations of new skid trails (Froehlich and Adams 1984; Froehlich and McNabb 1983).
- Estimated detrimental soil impacts from proposed skyline yarding are 4% of an Activity Area, and disturbance is mostly concentrated at landings.
- Impacts to soil from temporary road construction are expected to span an average width of 25 feet wherever roads are built. This estimate is based on the assumption of a running road surface 12–15 feet wide and an additional 3–6 feet, cleared of vegetation, on each side of the road, where the soil would likely be displaced and the organic litter layer disturbed and/or removed. Based on these estimates, temporary roads would affect <3% of any activity unit.
- Activity-generated slash piled along roadsides and in landings would be dispatched via sale of biomass materials, chipping, or burning. Slash within units would be left in place or treated using prescribed burning, mastication, or machine piling and burning. Treatment of slash is already incorporated in the estimates discussed above, because piles occur on areas where soils are already displaced or compacted.

Based on the above DSD assumptions, the proposed activities could cause soil disturbance on approximately 521 acres for Alternative B, 541 acres for Alternative C, or 502 acres for Alternative D, with the estimated increase of DSD in the harvest units ranging between 4% and 21% (see project file). The estimated increase includes skid trails, landings, and temporary roads that would be obliterated after project activities, so some measure of improvement would occur on those areas. The highest percent increase in soil disturbance occurs in units with proposed ground-based yarding methods. Some of these units have existing skid trails and landings that could be reused, thus minimizing the amount of new detrimental disturbance.

Implementation of project design measures and BMPs would minimize DSD, and the decommissioning of skid trails, landings, and temporary roads would further improve soil condition. Decommissioning activities include decompaction, recontouring, adding organic matter, and seeding/planting. Soil remediation improves water infiltration, reduces potential for weed invasion, stabilizes slopes, and improves tree growth and vegetation establishment.

About half of the units are below Forest standards for down large woody material due to excessive slash management after previous harvest activities. Units 107, 117, 142, and 148 (past partial cut units proposed for regeneration harvest), units 201–206, 208–212, 214–216, 220–222, 225–227, 233, 236, 304–306, 309, 310, 315–320, 322–324, 330–332, 343–351, 354, 356, 358, and 373 (past clear-cut proposed for commercial thin), and units 501 and 506

(past partial cuts proposed for improvement harvests) are lacking coarse woody material (<5 tons/acre). Units 209, 212, 213, 350, and 373 have thin litter/duff layers of <2 centimeters.

Commercial thin units would retain 40%–50% of their trees (or more), providing existing and future coarse woody material, which would maintain soil stability and productivity. For regeneration and improvement units, 14–28 standing trees per acre (tpa) would be retained as individuals or in groups. In addition, 7–33 tons/acre (depending on habitat type and aspect) of down woody material would be left in the interior of each unit. Units listed above for low coarse wood material would have tree retention levels on the high end of the range to account for the lack of existing down woody material. By adhering to these design elements, the action alternatives would meet Regional soil standards for organic material by adhering to these design elements.

Prescribed fire can remove organic matter from the soil or change the physical and chemical properties of soil if temperatures become too high, as in a severe burn. Underburning of drier, open stands using quick, light-severity burns that burn only top layers of duff would have minimal impacts on soils. Areas of mixed conifers where the objective is to create openings may experience more high-intensity fire, but not necessarily high-severity burns. High-severity fires can create water-repellent soils, which may result in soil erosion via mass wasting, sheet erosion, and/or gully erosion events. Mapping of local wildfires and ongoing monitoring of past prescribed burns indicate that approximately 4%–10% of the burn units would burn severely. This would be considered DSD, but the amount would meet Regional soil standards.

3.5.6.4 Cumulative Effects

For the purpose of the project, proposed harvest units and associated temporary roads and prescribed burn units are considered Activity Areas. The cumulative effects areas are the same as those discussed in the section addressing direct and indirect effects.

Areas affected by DSD can take several decades to recover, depending on soil texture, depth of compaction, and loss of organic material (Powers et al. 2005; Froehlich et al. 1983). This analysis considers all activities from the 1950s to the present, as well as 20–50 years into the future.

Conditions in the project area are a result of both natural processes and human activities. Past management activities include permitted grazing (1960s to present), recreation, fire suppression, road building and maintenance, and previous harvest activities (1950s to 2005). Past harvest and associated road construction have caused the most impact to the soil resource. Soil disturbance from these activities was incorporated into the DSD calculations.

Timber Harvest—Harvesting methods prior to the 1980s often consisted of hand felling trees, tractor skidding, machine piling of slash, and mechanical site preparation. Ground-based logging occurred on slopes exceeding 35%. Machine piling of slash often removed organic material and topsoil. Forest practices have changed over the last few decades. Project design measures, BMPs, and Forest Plan guidelines have been developed in order to reduce the extent of disturbance and maintain soil productivity. Designated skid trails, retention of woody material, operating under dry conditions, and limiting ground-based skidding activities to slopes less than 35% are now common practices.

Since the 1950s, 28% of the project area has been harvested. Most harvest activities occurred between the 1960s and 1990s, with approximately 2,500 acres of intermediate harvest and 9,500 acres of regeneration harvest. The most notable effects from harvest activities were compaction, displacement, and burned areas at landings. In steeper units, impacts were more dispersed. Less steep units had linear disturbance, mostly in the form of compacted skid trails and landings.

Fire—Approximately 19,490 acres (45% of the project area) have burned in the project area since 1870. Evidence of past wildfire was noted in many of the units during soil surveys. No impacts from fire suppression activities were observed.

Roads—Roads also influence soil, with long-term to permanent impairment of soil productivity. Although system roads are excluded in the determination of whether projects meet Forest Plan and Regional standards, these roads are a part of the existing condition. Within the project area, approximately 180 miles or 1,100 acres of system roads occur where topsoil and subsoil have been displaced, mixed, or lost to erosion. This acreage represents about 3% of the project area. Since 1997, over 30 miles of roads have been decommissioned. The project proposes to decommission 13.8 miles of system roads. An additional 65 miles of nonsystem roads would be decommissioned under the Clear Ridge Road Decommissioning Project, which is currently under development.

Grazing—Effects from grazing are moderate and tend to be highest near meadow areas, seeps, and springs. Impacts within the units are transitory (in the form of livestock trails) and are mostly on the edges of units or along old skid roads.

Recreation—Recreation activities that were noted during field surveys include dispersed camping, off-highway vehicles (OHVs) and full-size vehicle use, fuelwood cutting, and hunting. Dispersed camping is generally located on already disturbed sites along system roads. Effects from recreation activities are primarily associated with full-size vehicles and OHVs using system roads during wet conditions, creating wheel ruts that concentrate water flow. Disturbance from recreation activities within harvest and burn units is anticipated to be negligible.

Ongoing and foreseeable actions within the proposed Activity Areas (harvest and burn units) consist of grazing, recreation, and fire suppression. Grazing impacts could increase over a period of up to 20 years after harvest when more forage is available in the harvest units. Recreation activities are not expected to increase in the harvest units, so an increase in detrimental disturbance is not expected. Fuelwood cutting could increase after project activities, but many of the units are located along closed roads and access is limited. Fire suppression activities could increase DSD but the timing and extent of such disturbances cannot be predicted.

3.5.6.4.1 Alternative A—No Action

This alternative maintains the existing condition. It would not alter the current soil erosion or landslide potential and would retain the same amount of coarse woody material, both standing and down. Existing DSD would persist with very slight natural recovery of surface layers of compacted soils.

3.5.6.4.2 Alternatives B, C, and D

The cumulative effects of these Action Alternatives were based on the estimated potential of increased detrimental disturbance (based on Region 1 Supplement definitions) when added to existing disturbance and to evaluate whether the project met Regional and Forest Plan standards.

The cumulative effect of past and proposed activities was determined by adding the estimated disturbance from the project (increase of 4%–21%) to the existing DSD (0%–22%). Potential cumulative DSD within the harvest units is estimated to be between 7% and 40% prior to implementation of project design measures. (See project file for detailed information on individual units.)

As shown in Table 3-9, 75–78 units would require implementation of unit-specific design measures in order to meet Regional soil standards. These measures would limit the amount of increased DSD from project activities and reduce the amount of existing detrimental disturbance by obliterating existing skid trails and landings. The project would meet the Regional soil standards by limiting the extent of detrimental disturbance to <15% following project implementation or by trending positive for those units with DSD currently >15%.

Table 3-9. Unit-specific design measures to meet Regional soil standards

Design Category	Design Measures	Units	Alternative B	Alternative C	Alternative D
Reuse	Units that would exceed 15% without the reuse of existing templates	101, 104, 123, 133, 201, 204, 206, 211, 213, 215, 216, 221, 222, 228, 232, 235, 238, 307, 316, 323, 330, 331, 332, 337, 340, 347, 349, 352, 356, 501	30	31[a]	31[a]
Special	Units that would exceed the 15% standard—limited new disturbance to meet standard	134, 135, 147, 202, 203, 205, 208, 217, 220, 225, 229, 233, 236, 305, 306, 309, 315, 317, 335, 341, 343, 348, 351, 357, 373	25	25	22[b]
Trending Positive	Units that are currently over the 15% standard	202, 205, 209, 210, 212, 214, 219, 230, 231, 234, 237, 301, 304, 318, 319, 320, 333, 344, 345, 350, 354, 358	19	19	19
Forest Plan Amendment	Units that are over the 20% Forest Plan Standard	304, 320, 344	3	3	3
Number of Units with special design features/mitigations			77	78	75
Number of Proposed Harvest Units			143	145	130

[a]Unit 329 added to Alternatives C and D
[b]Units 203, 343, and 351 dropped from Alternative D

Reuse, Trending Positive, and Forest Plan Amendment Design Categories—Methods include the following: a logging system layout design would be developed to use as many of the existing skid trails and landings as possible to limit the amount of new detrimental disturbance; all skid trails and landings would be decommissioned after use; and equipment used for machine piling or mastication of activity slash would remain on designated skid

trails or would necessitate rehabilitation (decompaction or recontouring) of any detrimental disturbance created by its off-trail activity.

Special design category—Special attention is needed for these units to remain at or below 15% DSD following project implementation. Methods to meet or ensure this goal may include the following: main skid trails would be located only on existing disturbed areas with minimal, one-pass trails occurring on undisturbed ground; cut-to-length forwarder systems would be used; equipment used for machine piling or mastication of activity slash would remain on designated skid trails; and logging system layout designs would limit the amount of new detrimental disturbance (portions of the unit would be dropped if the layout plan cannot reach the entire unit while staying under the 15% standard). The estimated number of acres of new disturbance has been calculated for each unit and can be found in the project file. In addition, all skid trails, landings, and temporary roads would be decommissioned.

Decommissioning of skid trails and landings would directly improve soil conditions, processes, and functions in the units by decompacting soils and adding coarse woody material and other organic matter to the existing skid trails or road surfaces. Decompaction of soil would break up platy structure, increase water infiltration rates, and temporarily remove vegetation. Seed would be spread over disturbed ground to re-establish vegetative cover. Where available, duff and woody material would also be spread over the disturbed area to increase the recovery rate.

Skid trail decommissioning following harvest would utilize methods similar to Forest road decommissioning methods. Improvements in soil structure, water infiltration, aeration, root penetrability, and soil biological activity have been observed on the Clearwater National Forest after road decommissioning techniques were used there. A local soil study (Lloyd et al. 2010) observed that improved infiltration rates and soil bulk densities on decommissioned roads recover to values similar to never-roaded areas at 1, 5, and 10 years following decommissioning. In this same study and time frame, soil organic matter, total carbon, and nitrogen pools and processes increased to levels similar to those found in never-roaded surfaces. The Clearwater Forest Plan Monitoring Report (USDA Forest Service 2009b) stated that road decommissioning monitoring on the Forest across a wide range of sites has documented an increase in vegetative cover from 18% the year after decommissioning to 64% at 10 years after decommissioning. Skid trail and road decommissioning following reuse would also improve slope stability and decrease long-term erosion. Soil improvement activities on existing disturbed areas are expected to accelerate soil recovery and result in immediate or near-term (approximately 1–5 years) improvement in fundamental soil properties (e.g., bulk density, infiltration rates, soil organic matter, carbon, and nitrogen). These improvement activities would also provide support for continued long-term recovery of soil functions and productivity.

Irreversible and Irretrievable Commitment of Resources

Loss of the volcanic ash–influenced loess through erosion or removal (excavated temporary roads and skid trails) is irretrievable. Remaining soil materials would eventually develop (over a minimum of several decades) but may lack the water- and nutrient-holding properties of volcanic ash.

Small, localized areas would have reduced soil productivity until vegetation becomes reestablished and organic layers rebuild. These areas include temporary roads, skid trails, landings, and burned areas. Severely burned areas and areas with deep compaction could take decades to recover (Froehlich et al. 1983). Soil improvement activities such as decompacting soils and adding organic matter (woody material) could jump-start this process (Curren et al. 2005a, b).

3.6 VEGETATION

This section summarizes the effects of the alternatives on vegetation. This section was summarized from the "Clear Creek Restoration Project Vegetation Report," located in the project file.

Historically, the primary change agent within the Clear Creek drainage was a mixed-severity fire regime with return intervals ranging from 75 years to over 300 years. Insects, disease, and humans have become the primary agents of change since fire has been absent from the area.

Historic logging practices generally created small patches with regular edges that are inconsistent with natural change agents. The project is designed to utilize existing small patches of young trees to create larger patches of young trees by implementing variable retention regeneration methods, thinning through younger stands, and retaining 100% of stands in some areas. All of these activities would occur within the Focus areas. These activities were designed to create a disturbance pattern that is more in line with the size and scale of what historically would have been a mixed-severity fire regime. The location of the Focus areas was intended to utilize the existing young forest and the existing transportation system.

The goals of the project are designed to promote forest health by maintaining and reestablishing long-lived, early seral species such as white pine, ponderosa pine, and western larch, which have declined significantly over the last 80 years due to white pine blister rust and lack of disturbance (Arno et al. 2000; Keane and Arno 1996). Healthy forests with ecological resilience will help provide and sustain a broad range of ecosystem services including fire/fuels, wildlife, recreation, aquatics, and commodity production. Healthy, resilient landscapes have a greater capacity to survive natural disturbances and large-scale threats to sustainability, especially under changing and uncertain future environmental conditions, such as those driven by climate change and increasing demand for human use.

3.6.1 Analysis Area

The analysis area for this assessment includes only the 43,731 acres of NFS managed lands, all of which lie within the upper two-thirds of the drainage. The analysis area is ecologically and socially important for many reasons, including fish and wildlife habitat, opportunities for sustained local economic stability, protection of Nez Perce tribal treaty rights, and recreation opportunities.

The analysis indicators discuss the existing conditions at treatment unit and analysis area scales. However, the existing conditions of the biophysical environment also need to be discussed at the larger spatial scale of the Middle Fork Clearwater River basin, and sometimes northern Idaho or the northwestern United States, to provide appropriate context

for analyzing Clear Creek conditions. Agents of change—such as succession, weather, climate, fire, insects, and disease—must also be considered in these discussions.

3.6.2 Regulatory Framework

Forest Plan direction and all federal and State laws and regulations pertaining to the management of vegetative resources on the Forest would be applied to the project, including the NFMA of 1976. In addition, diagnosis, prescription development, and forest health analysis are guided by Forest Service regulations and policy (FSH 1909.60 and 2409.17; FSM 1920, 2020, 2470, 2471, and 2472) and the Region 1 Integrated Restoration and Protection Strategy.

3.6.2.1 Nez Perce Forest Plan

3.6.2.1.1 Timber Standards

Timber Standard 1. Require silvicultural examination and prescriptions before any vegetative manipulation takes place on forested lands. Final determination of the silvicultural system for areas to be harvested will be made by a certified silviculturist after an on-the-ground, site-specific analysis.

All proposed treatment stands have had stand exams or have been examined on the ground by a silviculturist, wildlife biologist, and fuels specialist. All vegetative treatments will have silvicultural prescriptions approved by a certified silviculturist prior to treatment implementation. Prescriptions will consider site-specific factors as well as multiple resource objectives, NEPA decisions, other regulatory requirements and Forest Plan goals, objectives, and standards. Action alternative treatments were proposed because they balance the management, operational, silvical, and human dimension requirements and respond to the purpose and need.

Timber Standard 2. Clear-cutting will not occur adjacent to previously harvested areas that are still considered openings.

No harvest is being proposed adjacent to stands that would be considered an opening. All proposed harvest units that are adjacent to previously harvested stands are certified as fully stocked, and the trees are greater than 10 feet in height.

Timber Standard 3. Permit timber harvest on lands classified as “unsuitable” for timber management to accomplish multiple use objectives.

No harvest is being proposed on unsuitable lands.

3.6.2.1.2 Protection Standards

Protection Standard 3. Minimize the impacts of the mountain pine beetle and other insect and disease infestations to the extent necessary to achieve the overall goals and objectives of this Forest Plan.

Loss of the long-lived early seral components in the ecosystem is a major factor in the lack of ecological resiliency. Regeneration treatments would remove dead, dying, and at-risk vegetation, which would trend the project area toward species compositions with increased resilience. Proposed treatments would minimize adverse pest effects and maximize a range of objectives.

3.6.2.2 National Forest Management Act

Vegetation Manipulation (36 CFR 219.27(b)[1]*)*: Ensure that technology and knowledge exist to adequately restock lands within 5 years after final harvest.

Restocking within 5 years of regeneration harvest is a required design item of the action alternatives. Technology and knowledge do exist to comply with this requirement. The Clearwater National Forest Forest Plan Monitoring and Evaluation Report for 2008 shows that 60% of stands harvested in 2002 have been certified, and the rest are progressing toward certification. Recent, similar monitoring data is not currently available for the Nez Perce National Forest; however, the project area is close enough to the Clearwater National Forest so that soils, habitat types, and moisture regimes are similar enough so that the Clearwater data can be used as a surrogate. The delay in certification was caused by a delay in achieving proper site preparation. This standard is met under the action alternatives.

Vegetation Manipulation (36 CFR 219.27(b)[1]): Be chosen after considering potential effects on residual trees and adjacent stands.

The potential short- and long-term negative effects of proposed activities on adjacent trees were considered during alternative development. Retention areas would be designed to minimize mortality during site preparation activities. Site-specific prescription modifications, such as change unit boundary, would be incorporated into the prescriptions. This standard is met under the action alternatives.

Silvicultural Practices (36 CFR 219.27(c): No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suitable for timber production.

Guidelines for determining suitability are found in the FSH (2409.13). The proposed harvest units are within the productive habitat types (as described in Cooper et al. 1991). None of the areas being proposed for treatment as part of the project are designated as unsuitable under the 1987 Forest Plan (USDA Forest Service 1987b). This standard is met under the action alternatives.

Even-aged Management (36 CFR 219.27(d): When timber is to be harvested using an even-aged management system, a determination that the system is appropriate to meet the objectives and requirements of the Forest Plan must be made. Where clear-cutting is to be used, it must be determined to be the optimum harvest method.

The action alternatives propose a combination of regeneration harvests (shelterwood establishment with reserves) and prescribed burning. The regeneration harvests are even-aged regeneration harvest systems. All vegetative treatments would have prescriptions prepared by a certified silviculturist. Overall, the analysis area stands display high mortality and low growth rates. All proposed treatments meet objectives and requirements of the Forest Plan.

3.6.2.3 Forest Service Manual 2471—Harvest Cutting

The size of harvest openings created by even-aged silvicultural in the Northern Region will normally be 40 acres or less. Creation of larger openings will require 60-day public review and Regional Forester approval.

The public was informed during scoping that regeneration openings in excess of 40 acres were proposed for the project area. A letter of approval to exceed the 40-acre opening size, with appropriate interdisciplinary analysis and documentation, would be received from the Regional Forester prior to project decision. The action alternatives would create openings on the landscape that are closer in scale and pattern to the openings developed under historic disturbance regimes for this area. Proposed harvest openings greater than 40 acres are discussed under Patch Size in the direct, indirect, and cumulative effects section. This standard is met under all the action alternatives.

3.6.3 Resource Indicators

No single indicator is a definitive measure of forest health or resilience. A healthy and resilient forest ecosystem is characterized by composition, structure, pattern, and ecological processes sustainable under current and future conditions.

The basis for the forest health analysis is comparison of the existing condition and the outcome of the alternatives to the desired condition in the project area. The desired condition is specific to the project area and was developed by incorporating data from Ecological Units of the Northern Region Subsections, VRUs, the Interior Columbia Basin Ecosystem Ecosystem Management Project, and the Selway and Middle Fork Clearwater Rivers Sub-basin Assessment. Studying historical data can reduce the chances of major future surprises (Veblen 2003). Forest composition and three characteristics of forest structure are used to assess trends toward or away from health and resilient conditions. Current conditions for these indicators were derived from legacy data Timber Stand Management and Records System (TSMRS) and FSVeg data.

The effectiveness of the alternatives in addressing forest composition objectives is indicated by the following:

- Percent of the project area with **forest cover type** dominated by the long-lived early seral species (western white pine, western larch, and ponderosa pine) compared to area dominated by grand fir and Douglas-fir (*Pseudotusuga menzeseii*).

The effectiveness of the alternatives in addressing forest structure objectives is indicated by the following:

- Percent of the project area in each stand **age class**. Age groups are young (0–40 years), mid-seral (41–100 years), mature (101–149 years), and old (150 years and older). Age class will be analyzed at the project area scale to allow comparison of alternatives and desired conditions at various points in time-based age class distributions by vegetation response units.
- **Vertical structure** is used as a within-stand structural arrangement indicator. It is represented by the number of vertical layers present in a stand. Vertical structure will be compared between alternatives. The 4 vertical structure classes are single-storied, two-storied, three-storied, and continuous vertical structure.

Landscape arrangement is discussed in terms of changes in patch sizes of the age classes. Comparison of current conditions and action alternatives to the desired condition is an indicator of resiliency at the project area scale.

3.6.4 Analysis Methodology

This analysis relies on comparison of existing conditions to desired conditions at various spatial and temporal scales. The DFC was used for comparing the present condition of the project area and anticipated conditions under the No Action alternative and the action three alternatives over time.

The interaction of successional development (as represented by habitat types in Cooper et al. 1991; USDA Forest Service 1997) and disturbances such as fire, insects, diseases, and human influences results in the species composition, structure, and landscape arrangement of an ecosystem Maps depicting habitat groups and VRUs are available in the project record. Existing conditions reflect past natural disturbances and management activities.

The vegetative desired condition for the project area was developed prior to any effects analysis. It is based on multiple resource objectives, using direction from the 1987 Forest Plan (USDA Forest Service 1987b), the proposed 2008 Plan Revision, the Selway Middle Fork Clearwater Sub-basin Assessment, and the draft Clear Creek NFMA document.

3.6.4.1 Data Sources

Current vegetative conditions were summarized using a vegetation inventory model. The model uses forest stand data from FACTS, TSMRS, FSVeg, and the Most Similar Neighbor modeling program (a model that populates estimated stand data to areas without stand exams). The inventory model also uses the Forest Vegetation Simulator (FVS) to grow all the stands to 2012 conditions, starting from the time when the stands last received a stand examination. Additionally, Region 1 Vmap data were used to further evaluate current conditions of the project area. The data were collected in 2006 and classified using the Region 1 Vegetation Council Existing Forested Vegetation Classification System. Inventory work is performed on individual stands. A stand is defined as a contiguous group of trees sufficiently uniform in species composition, arrangement of age classes, and condition on a relatively similar site (Oliver et al. 1996).

The FVS model provided a variety of information that was used in the analysis, including species composition, growth over time, and fire and fuels parameters. Documentation of these FVS attributes is found in Graham et al. (1994), Dixon (2002), Crookston (1999), Frankel (1998), and McGaughey (2002). Additionally, a patch analysis derived from the Fragstats program was used to describe and compare landscape pattern, arrangement, and patch size. The patch analysis is available in the project record.

3.6.5 Affected Environment

3.6.5.1 Biophysical Environment

Much of the vegetation in the Nez Perce-Clearwater National Forests is a result of the productive ash cap soils and the prevailing climatic pattern. The climate is dominated by Pacific maritime air masses and prevailing westerly winds. Within the analysis area, annual precipitation varies from 40 to 50 inches. Over 90% of the annual precipitation occurs during fall, winter, and spring months as a result of cyclonic storms in the form of a series of frontal systems moving east. The elevation of the analysis area ranges from 2,000 to 6,600 feet.

3.6.5.2 Ecological Settings and Vegetation Response Units

Bailey's ecosections were used to summarize historic vegetation information (McNab and Avers 1994). Each ecosection contains broad vegetation and topographic conditions. Local landtype classifications were used to divide each section into 3 settings, which are roughly similar to the subsections described in Ecological Units of the Northern Region: Subsections (Nesser et al. 1997). A map of potential vegetation types was used to attribute the forest cover types to the settings (Northern Region Cohesive Strategy Team 2002). The primary settings within the analysis area are Idaho Batholith Breaklands, Idaho Batholith Uplands, and Idaho Batholith Subalpine (USDA Forest Service 2006). The Subalpine setting comprises only 160 acres of the project area, and no treatments are proposed for these acres. Therefore, the Subalpine acreage will not be discussed in this analysis.

Incorporated within each of the 3 settings are 7 VRUs. These units are broad ecological land sections that contain habitat type groups and terrain that have similar patterns of disturbance and successional processes. Patterns of plant community composition, age class structure, and patch size tend to fall within certain ranges for each VRU. The components used to build the VRU classification system are habitat type groups (potential vegetation), landforms, climate, and presettlement disturbance processes (such as fire regimes). The desired conditions, potential natural vegetation that could occupy the project area following a disturbance, and a discussion of successional patterns and development are presented below. . The existing conditions for age class groups are also presented to give an idea of where potential land management activities could be used to shift the project area toward desired conditions. Existing conditions are described for the year 2012 and 2017. The year 2017 was included because that is the estimated year when actual vegetative management activities would be implemented. Stands will continue to age through that time, which will result in age class shifts.

Idaho Batholith—Breaklands

The Breaklands are characterized by low- to mid-elevation canyons on steep south aspects. The Breaklands setting is dominated by steep slopes and deep canyon walls through which the Middle Fork and Clear Creek tributaries flow. Soils are derived from granite, border zone, and basalt geologies. Landslides and surface creep are the dominant erosion processes. The Breaklands are known for having inclusions of LSP areas and shallow soils. These characteristics make this setting more susceptible to erosion and more sensitive to disturbance.

Wildfire was the primary process affecting plant succession, composition, and distribution. Steep terrain favors rapid, upslope spread of wildfires. Stand-replacing fires are more prevalent on long, steep slopes and less frequent in adjoining moist habitats. Patches on dry aspects are uneven-aged, resulting from nonlethal to mixed-severity wildfire. Patches on moist aspects are even-aged, with uniform vegetation and fuel conditions resulting from stand-replacing fires. Early seral species (shrubs, forbs, and grasses), Douglas-fir, ponderosa pine, and grand fir readily reestablish following wildfire episodes.

VRU 3: 3,030 acres (7% of the analysis area)

Desired Condition: Open stands of large ponderosa pine and Douglas-fir dominate upland habitats. Approximately 40%–60% of the landscape contains 10–25 tpa of ponderosa pine and Douglas-fir older than 150 years. Mixed-severity disturbance occurs on about 10%–15% of the analysis area in any 2-decade period. Low-severity disturbances occur on up to 50% of the landscape in a decade. Old forests occur both as isolated or open-understory, large ponderosa pine and Douglas-fir (uplands) and mixed to coniferous forest (shaded or moist habitats).

The desired and existing conditions for patch size, successional stage distribution, and tree size class for VRU 3 are shown in Table 3-10.

Table 3-10. Desired and existing conditions for patch size, successional stage distribution, and tree size class for Vegetative Response Unit (VRU) 3

Factor	Desired Conditions	Existing Conditions
Patch size	50–200 acres	6–183 acres 38% within size range
Successional Stage Distribution (%)		
Young Mid-seral Mature Old-forest No data/no survey	15%–25% 15%–35% 10%–30% 20%–50% --	6% 66% 13% 4% 11%
Tree Size Class		
Non-forest <5 inches dbh 5–8.9 inches 9–21 inches 21+ inches No data/no survey	5%–20% 5%–30% 10%–20% 20%–40% 20%–40% --	6% 32% 10% 15% 8% 28% (in roadless area)

The greatest departures from desired conditions in VRU 3 are the need for increases in both young- and old-forest successional stages. The action alternatives would use regeneration harvest to increase the young age class through management of the mid-seral stage, which exceeds the desired high condition by almost 1,000 acres. Commercial thinning or full retention would be used to promote healthy stands that could grow into the late- and old-forest stages. Patch sizes are on the low end of desired ranges. Proposed regeneration harvest and burning activities would increase patch sizes to better emulate natural disturbance patterns.

VRU 8: 11,350 acres (26% of the analysis area)

Desired Condition: Grand fir, Douglas-fir, and western redcedar dominate stands during late successional stages. Early seral stages range from relatively open to densely stocked and are usually dominated by a mix of early seral and mid-seral species, including lodgepole pine, western larch, and western white pine. Ponderosa pine, Engelmann spruce, and Pacific yew may be present. Important elements include coastal disjunct plant species, early to seral tall shrub and hardwood communities, and old-growth inclusions of western redcedar riparian

habitats. Patch sizes are widely variable and result from irregular, infrequent mixed-severity fires and very infrequent stand-replacing fires throughout the landscape. Old-forest habitats dominated by shade-tolerant conifers typically occur in patches of <40 acres and are associated with topographic inclusions (benches, basins, flat ridges, and moist habitats). These smaller patches are a result of stand-replacing fires. About 50%–60% of stands originate from stand-replacing fires. Postdisturbance stands include at least 10 live tpa that are >150 years old. Relict Douglas-fir, western larch, grand fir, and ponderosa pine are common on ridges.

The desired and existing conditions for patch size, successional stage distribution, and tree size class for VRU 8 are shown in Table 3-11 below.

Table 3-11. Desired and existing conditions for patch size, successional stage distribution, and tree size class for Vegetative Response Unit (VRU) 8

Factor	Desired Conditions	Existing Conditions
Patch size	300–1,500 acres	8–282 acres 0% within size range
Successional Stage Distribution (%)		
Young Mid-seral Mature Old-forest Private	15%–25% 20%–40% 15%–35% 10%–40% --	9% 43% 22% 23% 2%
Tree Size Class		
Non-forest <5 inches dbh 5–8.9 inches 9–21 inches 21+ inches No data/no survey	5%–20% 5%–30% 10%–20% 20%–40% 20%–40% --	5% 15% 4% 34% 36% old 6%

The greatest departure from desired conditions in VRU 8 is the need for an increase in young forest. The proposed action alternatives would use regeneration harvest and prescribed fire to reduce the mid-seral stage and increase patch size.

VRU 12: 40 acres (<1% of the analysis area)

Desired Condition: Bluebunch wheatgrass and Idaho fescue dominate dry upland habitats; shrubs dominate draws and moist inclusions. Patch sizes are limited by aspect and coniferous vegetation. Invasive forbs and grasses are reduced or eliminated. Very frequent (5- to 20-year intervals), low-severity fire maintains open grasslands and rejuvenates shrub habitats. Ponderosa pine and an occasional Douglas-fir occur incidentally. This VRU is incidental at the analysis scale because the unit comprises only 40 acres within the analysis area. All 40 acres are proposed for grassland restoration activities.

Idaho Batholith—Uplands

The Uplands setting is a mix of gentle-to-steep slopes that form shallow canyons. Surface soils are derived from granite, border zone, and basalt geologies. The warm, moist climate, in

combination with deep volcanic ash soils, creates high site productivity for forested stands. Surface creep is the dominant erosion process; mass-wasted areas are local and uncommon.

Fire was the primary landscape disturbance process affecting plant succession, composition, and distribution. The fire regime is variable due to irregular terrain that discourages rapid fire spread. This fire regime creates a mosaic of mixed- to lethal-burned uplands and nonlethal or unburned riparian habitats. Small openings created by the more frequent low- and mixed-severity fires result in a mix of tree species and ages. Stand-replacing wildfire occurs at intervals of 150–250 years or more (Kapler-Smith and Fischer 1997) and is likely associated with strong wind episodes in combination with extended drought.

VRU 7: 2,570 acres (6% of the analysis area)

Desired Condition: Stands are often dominated by mixed occurrences of grand fir, Douglas-fir, Pacific yew, western larch, Engelmann spruce, and lodgepole pine. Western white pine may be present. The decline in white pine has led to the increase of grand fir and Douglas-fir, which have a high susceptibility to root diseases. Pacific yew and moist old-growth are important elements. About 20%–40% of stands originate from mixed-severity disturbances, and 60%–80% originate from stand-replacing disturbances. Postdisturbance stands include at least 10 live tpa that are >150 years old. Two or more age classes are common in any given stand.

The desired and existing conditions for patch size, successional stage distribution, and tree size class for VRU 7 are shown in Table 3-12.

Table 3-12. Desired and existing conditions for patch size, successional stage distribution, and tree size class for Vegetative Response Unit (VRU) 7

Factor	Desired Conditions	Existing Conditions
Patch size	40–300 acres	1–282 acres 20% within size range
Successional Stage Distribution (%)		
Young Mid-seral Mature Old-forest Private	10%–20% 15%–35% 10%–30% 35%–65% --	26% 25% 28% 20% 2%
Tree size class		
Non-forest <5 inches dbh 5–8.9 inches 9–21 inches 21+ inches	1%–10% 5%–20% 10%–25% 25%–35% 35%–45%	2% 27% 10% 16% 46%

The greatest departure from desired conditions in VRU 7 is the need for an increase in old forests. The young-forest stage is in excess of the desired high condition by 150 acres. The action alternatives would use regeneration harvest to create young forests and would implement commercial and precommercial thinning to promote healthy stands (by selecting for preferred, long-lived species and reducing stand densities to reduce competition for light, water, and nutrients). Thinning would help the stands progress toward the older age classes.

VRU 10: 5,170 acres (12% of the analysis area)

Desired Condition: Open-canopied, multi-aged old-forest stands of grand fir, Engelmann spruce, subalpine fir, western redcedar, and Sitka alder are the dominant cover types. Isolated Douglas-fir, western larch, lodgepole pine, and Pacific yew locally occur on ridges. Mixed alder, forbs, and grasses are well distributed and persistent as inclusions. Multi-aged, mixed-species stands originate from low- and mixed-severity disturbances, including windthrow. Old-forest habitats are dominated by shade-tolerant conifers associated with moist habitats.

The desired and existing conditions for patch size, successional stage distribution, and tree size class for VRU 10 are shown in Table 3-13.

Table 3-13. Desired and existing conditions for patch size, successional stage distribution, and tree size class for Vegetative Response Unit (VRU) 10

Factor	Desired Conditions	Existing Conditions
Patch size	40–800 acres	5–282 acres 24% within size range
Successional Stage Distribution (%)		
Young Mid-seral Mature Old-forest	10%–20% 10%–30% 10%–30% 35%–65%	9% 18% 15% 58%
Tree Size Class		
Non-forest <5 inches dbh 5–8.9 inches 9–21 inches 21+ inches Unknown/no survey data	1%–10% 5%–20% 10%–25% 25%–35% 35%–45% --	0.1% 10% 0.1% 38% 40% 12%

The greatest departure from desired conditions in VRU 10 is the need for a slight increase in the young forest. Old forest occurs near the top end of desired condition. As expected, mortality from insects, disease, and old age is becoming more evident in these stands as they mature. Proposed regeneration harvest would be used to reduce the old-forest component while increasing the young forest. Proposed commercial thinning in the mid-seral forests would promote healthy, vigorously growing stands.

VRU 17: 20,485 acres (47% of the analysis area)

Desired Condition: Western redcedar and grand fir are the dominant mature forest cover types in the absence of disturbance. With stand reinitiation, Douglas-fir, western white pine, and western larch occur as isolated relics in mature and old stands. The decline in white pine has led to the increase of grand fir and Douglas-fir, which have a high susceptibility to root diseases. Open-canopied, multi-aged old forest and tall shrub communities are important elements. About 40%–60% of stands evolve with mixed-severity disturbances, and 40%–60% develop following stand-replacing disturbances. Postdisturbance stands include at least 10 live tpa that are >150 years old. Old-forest habitats are dominated by shade-tolerant western redcedar and grand fir.

The desired and existing conditions for patch size, successional stage distribution, and tree size class for VRU 17 are shown in Table 3-14.

Table 3-14. Desired and existing conditions for patch size, successional stage distribution, and tree size class for Vegetative Response Unit (VRU) 17

Factor	Desired Conditions	Existing Conditions
Patch size	300–1,000 acres	2–270 acres 0.4% within size range
Successional Stage Distribution (%)		
Young Mid-seral Mature Old-forest	10%–20% 15%–35% 10%–30% 25%–55%	20% 33% 14% 32%
Tree Size Class		
Non-forest <5 inches dbh 5–8.9 inches 9–21 inches 21+ inches Unknown/ no survey data	1%–10% 5%–20% 10%–25% 25%–35% 35%–45% --	3% 20% 9% 20% 43% 6%

No departures from desired conditions occur in VRU 17; however, young forest would decline toward low desired conditions by 2017. Proposed precommercial thinning in young forest and commercial thinning in mid-seral forests would promote healthy stands as they continue to grow into the late- and old-forest stages. Regeneration harvest would be used to increase patch sizes to more natural levels and to maintain desired levels within 5 years.

3.6.5.1 Vegetative Agents of Change

Vegetation is a fundamental part of terrestrial ecosystems. The vegetation that exists across an ecosystem and through time is a function of the physical state, the climate, the plant species available in an area, the disturbance history of the site, and the successional processes that follow disturbance. Most landscapes are a mosaic reflecting the interaction between disturbance and plant succession. The interaction between disturbance forces and successional processes is a keystone process shaping the landscape vegetation mosaic (Zack and Morgan 1994). Understanding disturbance and succession and how they relate to forest composition is necessary to understand the current vegetative state. Additionally, timber harvest has created disturbances to successional patterns

3.6.5.1.1 Weather

While fires can create dramatic changes to successional development and the ecosystem, weather continually modifies the ecosystem. Moisture and temperature are important to characterize the biophysical environment. Weather disturbances (such as wind events, periods of high moisture, or drought) adjust species composition, structure (at the fine and coarse scale), and function (growth; conditions conducive for insect, disease, or fire mortality) consistently throughout successional development. Weather is not predictable in terms of ecological timing or landscape arrangement, but it has continual and important influence. Examples of weather-related influences include changes in composition and

structure due to an ice/wind storm, extended drought creating conditions conducive to bark beetle infestation (mountain pine beetle currently occurring at higher elevations), and the survival of regeneration based on occurrence of a series of moist or droughty years. As discussions move from weather (atmospheric conditions over a short period of time) to climate (how the atmosphere behaves over long periods of time), the continual effects of moisture, temperature, and weather disturbances define the environment and therefore the compositions, structures, and function of the ecosystem.

3.6.5.1.2 Climate Change

Climate change and management of natural resources with a changing climate are both science and social issues. Managing in the face of climate change is a common forest management question, both in terms of the effect climate change will have on the managed ecosystem and the effect the Proposed Action may have on the climate.

The Forest Service has been involved in climate change research for about 2 decades and has a century of science and management experience. The Forest Service has stated its objective regarding climate change as follows:

> The aim is to reestablish and retain ecological resilience of NFS lands and associated resources to achieve sustainable management and provide a broad range of ecosystem services. Healthy, resilient landscapes will have greater capacity to survive natural disturbances and large scale threats to sustainability, especially under changing and uncertain future environmental conditions, such as those driven by climate change and increasing human uses (Forest Service Manual 2020.2).

The future of forest management in a changing climate is best addressed with approaches that embrace strategic flexibility, characterized by risk-taking, the capacity to reassess conditions frequently, and willingness to change course as conditions change (Hobbs et al. 2006 from Millar et al. 2007). The appropriate approach is an integrated strategy involving a scientific and social climate change approach that considers predictions/scenarios specific to the local ecosystem as well as analysis of specific ecosystem responses. The Washington Climate Change Impacts Assessment[2] is the most recent and area-specific tool available to understand potential changes in northern Idaho. Until more scientific details for this approach are available, a conservative forest management approach is reasonable; a conservative approach is based on diversity and resilience and can be adjusted in the short, middle, and long terms (adaptive management). This is the basis for proposed treatments in the Clear Creek project area.

3.6.5.1.3 Fire

[2] http://cses.washington.edu/cig/pnwc/pnwc.shtml

While forests can be disturbed by weather, insects, and microorganisms, all of these interact with fire. Fire can release a large amount of energy in short periods of time, which is why fire is one of nature's most powerful disturbance forces. During summer, the Clear Creek watershed experiences significant dry periods when vegetation can sustain fires. Lightning was probably the primary ignition source prior to Euro-American settlement. Lightning and human causes are the present-day ignition sources. Fire suppression was considered to be effective at the landscape scale in the 1930s. Understanding fire as an agent of change allows understanding of the functional interactions in a healthy, sustainable ecosystem.

Understanding past fire disturbance or vegetation scenarios for an area allows increased understanding of the area's resilience and sustainability.

Data from the predominant VRUs within the project area (VRUs 8 and 17), combined with the analysis done for the Clear Creek watershed assessments, indicate that only the lethal, very infrequent (151- to 300-year interval) fire regime is still operating. The nonlethal underburning fire regime no longer occurs, due to fire suppression efforts. Fires that start under underburning conditions are usually extinguished at <1 acre in size. The mid-seral successional stages are, therefore, denser and more uniform over the landscape than those that would have occurred historically. For a more detailed discussion of fire ecology, refer to the fire/fuels specialist report.

Fire Severity

- Nonlethal fires – fires that kill 10% or less of the dominant tree canopy. A much larger percentage of small, understory trees, shrubs, and forbs may be burned back to the ground lines.
- Mixed-severity fires – fires that kill more than 10% but less than 90% of the dominant tree canopy. These fires are commonly patch, irregular burns, producing a mosaic of different burn severities.
- Lethal fires – fires that kill 90% or more of the dominant tree canopy. These are often called stand-replacing fires, and they often burn with high severity. They are commonly crown fires.

3.6.5.1.4 Insects and Disease

In the absence of fire, forest insects and diseases can accelerate or reset forest succession by affecting tree species, size, and stand density. Functions of pathogens and insects in forests can be divided into 2 parts: the action, such as killing trees, decaying heartwood, or reducing growth; and the outcome, such as changing species composition of stands or changing stand structure from a mature, closed canopy to a pole-size, low-density structure (USDA Forest Service 2000). Based on summarized species composition, tree diameters, and age classes from Vmap and FSVeg, approximately 76% of the project area may currently be susceptible to insect and disease activity. This level of susceptibility is important because over the last 75 years, insects and disease have replaced fire as the most prominent agent of change.

Root Diseases—Historically, root diseases were a significant factor in reducing subalpine fir and grand fir, which tended to outcompete western larch and, on some sites, white pine. Grand fir regenerated readily in the early stages of stand development but dropped out as a significant component due to high rates of mortality caused by root disease (Byler and Zimmer-Grove 1990). White pine and larch have a higher level of resistance to root diseases at this stage of stand development and were able to capitalize on the increased availability of growing space. Fire exclusion and the loss of these species through logging, blister rust, and mountain pine beetle have reduced the opportunity for early seral species to become established in root disease areas (Harvey et al. 2008).

Insects: Major insect change agents of the Clear Creek watershed include mountain pine beetle, Douglas-fir beetle, Douglas-fir tussock moth, and fir engravers. Historically, mountain pine beetle played an important successional role in mature white pine or lodgepole forests; the presence of mountain pine beetle led to various significant changes, including altered species composition and widespread tree mortality that resulted in fuel buildup and increased fire susceptibility. Douglas-fir beetle and fir engravers have always been present throughout the Clear Creek watershed, and both have been observed in the project area over the last 10 years. The presence of root disease in many of the Douglas-fir and grand fir forest types has resulted in even higher endemic levels of the Douglas-fir beetle and the propensity for rapid beetle population buildups during favorable conditions (Lockman and Gibson 1998). Historically, short-term increases in fuel loading may have led to increased fire intensity and severity and subsequent development of openings conducive to regeneration of early seral species. In some cases, insect infestations may have contributed to large stand-replacing fires (USDA Forest Service 1998a).

White Pine Blister Rust: White pine blister rust was introduced into northern Idaho and this analysis area in the early 1900s. Blister rust is a fungal disease that forms cankers on branches or stems of trees; the cankers then weaken the trees and may eventually kill them. Weakened trees also become susceptible to other disease or to insect attack. Trees were either killed or harvest was accelerated to capture anticipated loss of economic value. In addition, the young white pine component (established following the 34 fires in 1910) was highly impacted by blister rust, as these young trees had little natural resistance, if any, to the disease. The project area has experienced substantial white pine mortality. Heavy fuel loads, along with increasing amounts of grand fir, are likely a result of high numbers of white pine succumbing to blister rust. The presence of live 50- to 80-year-old white pine is an indicator of some level of natural genetic resistance to blister rust in these survivors. Natural blister rust resistance is thought to be <10%. The live white pine is an ecologically important component of the resource area, both in terms of its resistance to blister rust and because of its role as a successional component as the stands develop.

3.6.5.1.5 Harvest

Logging activities were initiated in the area in the 1960s. Known past harvest in the project area has been cataloged and summarized in Table 3-15. Regeneration harvest converted mature stands into younger and to smaller size classes. Additional regeneration harvest occurred at the same time on adjacent private and State property.

Table 3-15. Past harvest activities in the Clear Creek project area

Harvest Method	Year							
	1930–1939	1950–1959	1960–1969	1970–1979	1980–1989	1990–1999	2000–2009	Grand Total
Commercial thin	—	—	61	130	357	29	—	577
Fuel break	—	—	—	—	—	49	—	49
Improvement cut	—	—	—	—	—	27	64	91
Liberation cut	—	—	—	—	—	—	82	82
Clear-cut	136	578	3,686	2,367	1,075	1,143	353	9,339
Precommercial thin	—	—	232	712	127	285	109	1,465
Sanitation (salvage)	—	—	270	680	225	1,431	579	3,185
Seed tree harvest	—	—	738	420	95	226	78	1,557
Shelterwood harvest	—	—	58	240	603	272	159	1,333
Single tree selection	—	—	—	217	—	36	—	253
Grand Total	136	578	5,046	4,800	2,482	3,498	1,424	17,963

3.6.5.2 Vegetative Conditions in the Project Area

3.6.5.2.1 Forest Composition

Forest cover types describe the dominant tree species present in a stand. The existing and desired forest cover types in the project area are displayed in Table 3-16. The forest cover types in the project area are primarily mixed conifers and shrubs. The Uplands and the Breaklands have relic, long-lived early seral species (western larch and ponderosa pine) but are primarily composed of late-seral, shade-tolerant species. Some scattered western white pine remain in the project area. The presence of long-lived early seral components can be used as an indicator of forest health. These species and their composition, structure, and functions have the desired resistance (ability to prevent impacts and protect valued resources), resilience (capacity of ecosystem to return to desired conditions after disturbance), and response (ability to transition from current to new conditions). Currently the project area is well out of the desired range for these species. This change is consistent with the Upper Columbia River Basin (USDA Forest Service 1997) and the Northern Region Overview (USDA Forest Service 1998a). While the Forest Plan does not mandate management at levels of historic species compositions and structures, these are helpful reference points to understand what trends may be needed over the long term to increase resiliency in the ecosystem.

Table 3-16. Existing and desired forest cover types in the Clear Creek analysis area

Dominance Type	Breaklands (36%) (Vegetation Response Units 3, 8, 12)		Uplands (63%) (Vegetation Response Units 7, 10, 17)	
	Desired Range (%)	Existing (%)	Desired Range (%)	Existing (%)
Ponderosa Pine/Mix	15–30	11	10–15	8
Douglas-Fir	15–30	32	10–15	15
Lodgepole Pine	0–5	<1	20–30	4
Western Larch	5–10	0	5–10	<1
Cedar/Grand Fir	9–17	54	25–50	59
White Pine	0–5	1	0–5	<1
Spruce/Fir Mix	0–5	2	0–5	7
Alpine Fir/Mt. Hemlock	0	0	0	<1
Seral Grass/Shrub	8–15	7	0–5	6
Non-Forest	10	0	3	0

3.6.5.2.2 Structural Stages—Age Class

Age class distribution is useful in describing the natural disturbance pattern on a landscape. VRU age class distribution is based on the Upper Columbia River Basin Environmental Assessment and incorporates data from Kapler-Smith and Fischer et al. (1997). Fires in 1880 and 1919, as well as past timber harvesting, have created the current age class distribution within the project area. The current and desired age class distributions are in Figure 3-2 through Figure 3-6.

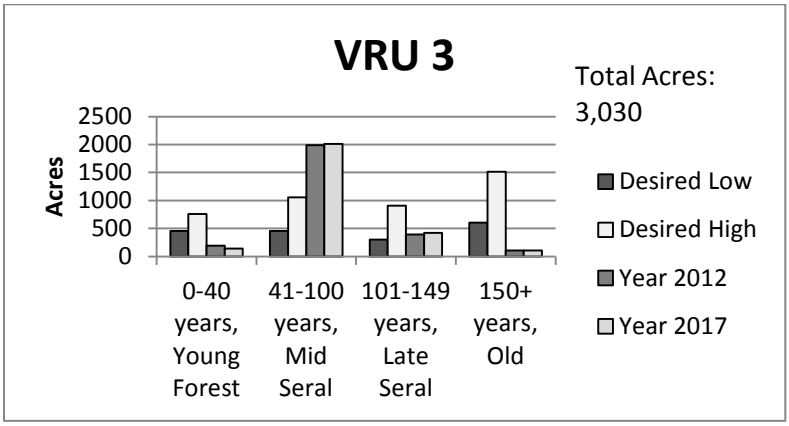

Figure 3-2. Current and desired age class distribution for Vegetative Response Unit (VRU) 3 (Breaklands)

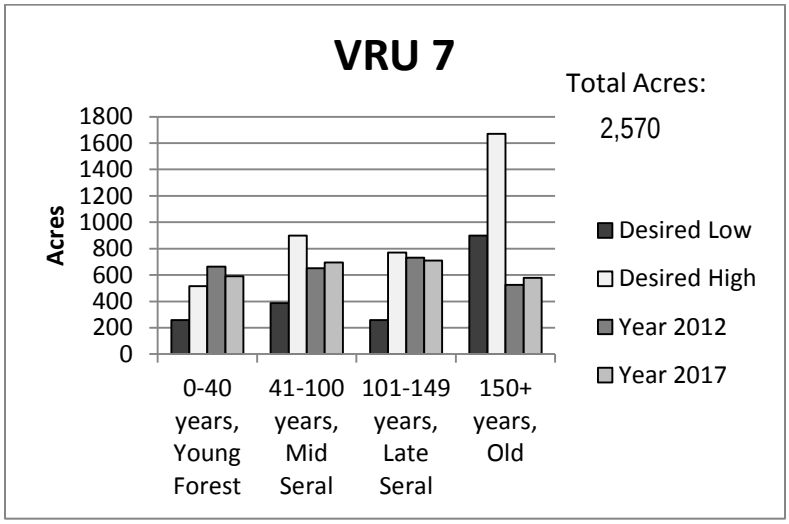

Figure 3-3. Current and desired age class distribution for Vegetative Response Unit (VRU) 7 (Uplands)

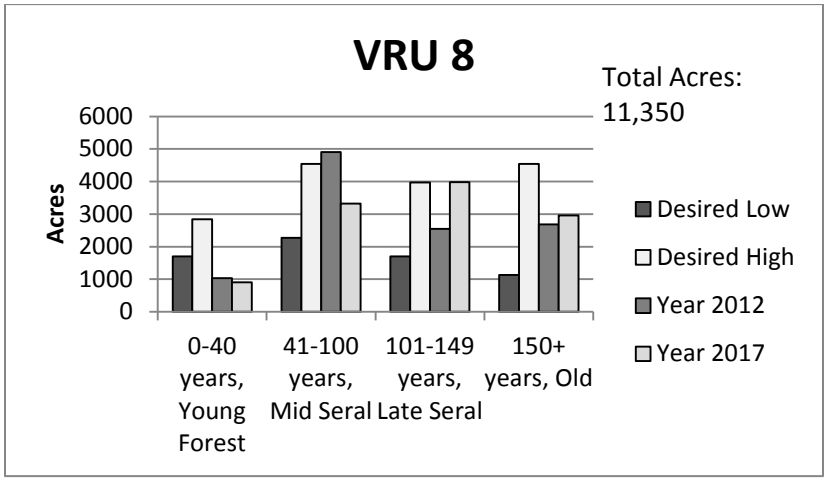

Figure 3-4. Current and desired age class distribution for Vegetative Response Unit (VRU) 8 (Breaklands)

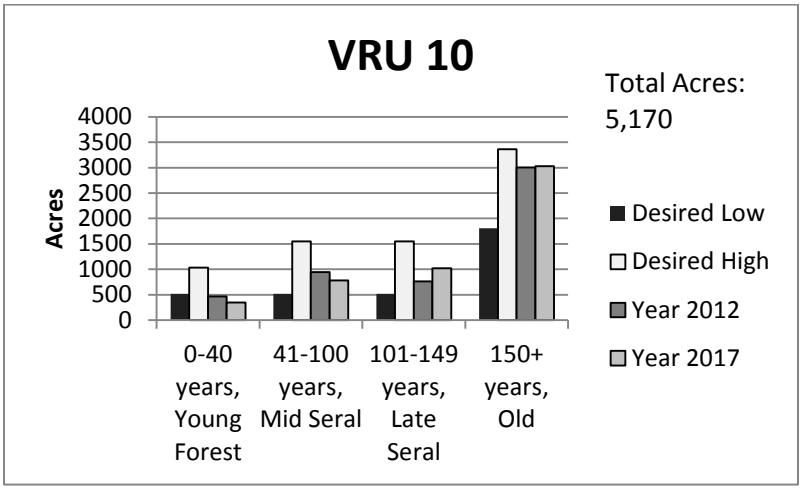

Figure 3-5. Current and desired age class distribution for Vegetative Response Unit (VRU) 10

(Uplands)

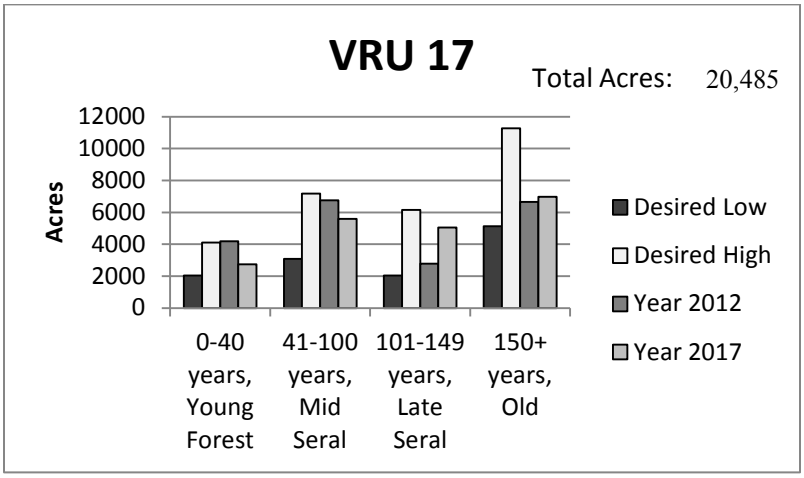

Figure 3-6. Current and desired age class distribution for Vegetative Response Unit (VRU) 17 (Uplands)

3.6.5.2.3 Vertical Structure

Vertical structure is used as a within-stand density indicator. Vertical structure depicts the number of vertical tree layers present in a stand (Berglund et al. 2008). The 4 vertical structure classes include single-storied (62% of the project area), two-storied (27%), three-storied (5%), and continuous (6%) vertical structure. The predominant class within the project area is the single-storied class, probably because the majority of the project area is in the stem exclusion stage. The single-storied stands will eventually enter the understory reinitiation stage and become multi-storied stands. The current condition is now within the desired range. It is desired to have dominance of single- and two-storied stands in the project area, with fewer areas of three-storied stands and continuous vertical structures. The single- and two-storied stands are favorable in terms of fuels management, and two-storied stands provide preferred habitat for some wildlife species.

Landscape Arrangement

The arrangement of stand size classes and vertical structures on the landscape influences the way some types of fire, insects, or wildlife will move across the landscape. Managing for connected landscapes is seen as a way to increase a landscape's resilience and allow animal movement (and in some cases, plant movement). The creation of a vegetation mosaic, by design, allows the land manager to control, or at least ameliorate, hazards of all kinds (Brackebusch 1973).

Patch size and arrangement must be considered with all management actions: retaining resilient, large size class patches is an important objective; land managers must also consider that the young patch established this decade may become the most resilient old-growth patches in 150 years. Not all disturbance agents produce the same patch and scale characteristics. Mixed-severity fire causes a different patch size and arrangement on the landscape than large stand-replacing fire or insect and disease disturbances do. The current average patch sizes and ranges are displayed in Table 3-17. The desired condition varies by VRU but on average strives for patch sizes of 50–200 acres minimum and 1,000 acres maximum, with variable tree retention and forest connectivity where possible.

Table 3-17. Current average patch size and range

Structural Stage	Percent of Analysis Area by Structural Stage (%)	Average Patch Size (Acres)	Range of Patch Sizes (Acres)
Non-Forest	0	0	0
Seral Shrub	7	41	1–369
Stand Initiation	17	17	1–115
Stem Exclusion	26	13	1–434
Understory Reinitiation	17	23	1–153
Young Multi-Strata	3	20	1–21
Old Single-Strata	17	20	1–167
Old Multi-Strata	13	34	1–168

Old-growth Forest

The Forest Plan designates MA 20 to retain and to manage for old-growth habitats. MA 20 "…is made up of forested lands…and occurs on a variety of landtypes. Approximately half of the area has a timber condition class of overmature sawtimber (150 years or older). The remainder of the area is comprised of immature stands (40–80 years) that will provide for replacement old-growth habitat" (USDA Forest Service 1987b, p. III-56).

Data from the 2007 Forest Inventory and Analysis indicate that an estimated 13.4% of the Forest is old-growth habitat, as defined by Green et al. (2008). The lower and upper confidence interval bounds are 11% and 16.1%. The Forest meets the Forest-wide old-growth standard.

The Forest Plan objectives for MA 20 are to maintain viable populations of wildlife species that are dependent on old-growth habitat. At least 10% of suitable old-growth habitat would be managed as old growth for old growth–associated species. This acreage will be distributed across the Forest in a way that ensures that at least 5%of the forested acres within major prescription watersheds of 6,000–10,000 acres will be managed as old-growth habitat (USDA Forest Service 1987b, page II-6). Appendix N of the Forest Plan describes the preferred distribution requirements and outlines an old-growth identification process: "Old growth stands should be at least 300 acres. Next best would be a core block of 150 acres with the remaining blocks of no less than 50 acres and no more than ½ mile away from another old growth block. If existing old-growth blocks are less than 100 acres, the stands between the old-growth blocks should be managed as an old-growth complex" (USDA Forest Service 1987b, p. N-2).

Old-growth analysis areas (OGAAs) were designated across the Forest in order to maintain the minimum Forest Plan requirements for amount and distribution of old-growth habitats. The analysis area includes 7 OGAAs (Table 3-18). Two of the OGAAs are small and do not meet the Forest Plan assessment scale of 5,000–10,000 acres. OGAA 618 is 1,036 acres, and OGAA 619 is 935 acres. For this analysis, these OGAAs were combined with adjacent OGAAs to comply with Forest Plan direction.

Verified old growth is defined by Green et al. (2008) in Old-Growth Forest Types of the Northern Region. Figure 3-7 and Table 3-18 show the verified old growth in each OGAA; the data derive from 2010, 2011, and 2012 stand exams and field validation.

Table 3-18. Verified old-growth habitat in each Old-Growth Analysis Area (OGAA) in the Clear Creek analysis area

Old Growth Analysis Area	Old Growth Analysis Area Acres	Verified Old Growth	
		Acres	Percent (%)
40610	5,665	1,199	21
40611/618	7,935	933	13
40613	9,765	994	10
40615	12,928	1,141	9
40616/619	7,373	387	6
Total	43,666	4,654	11

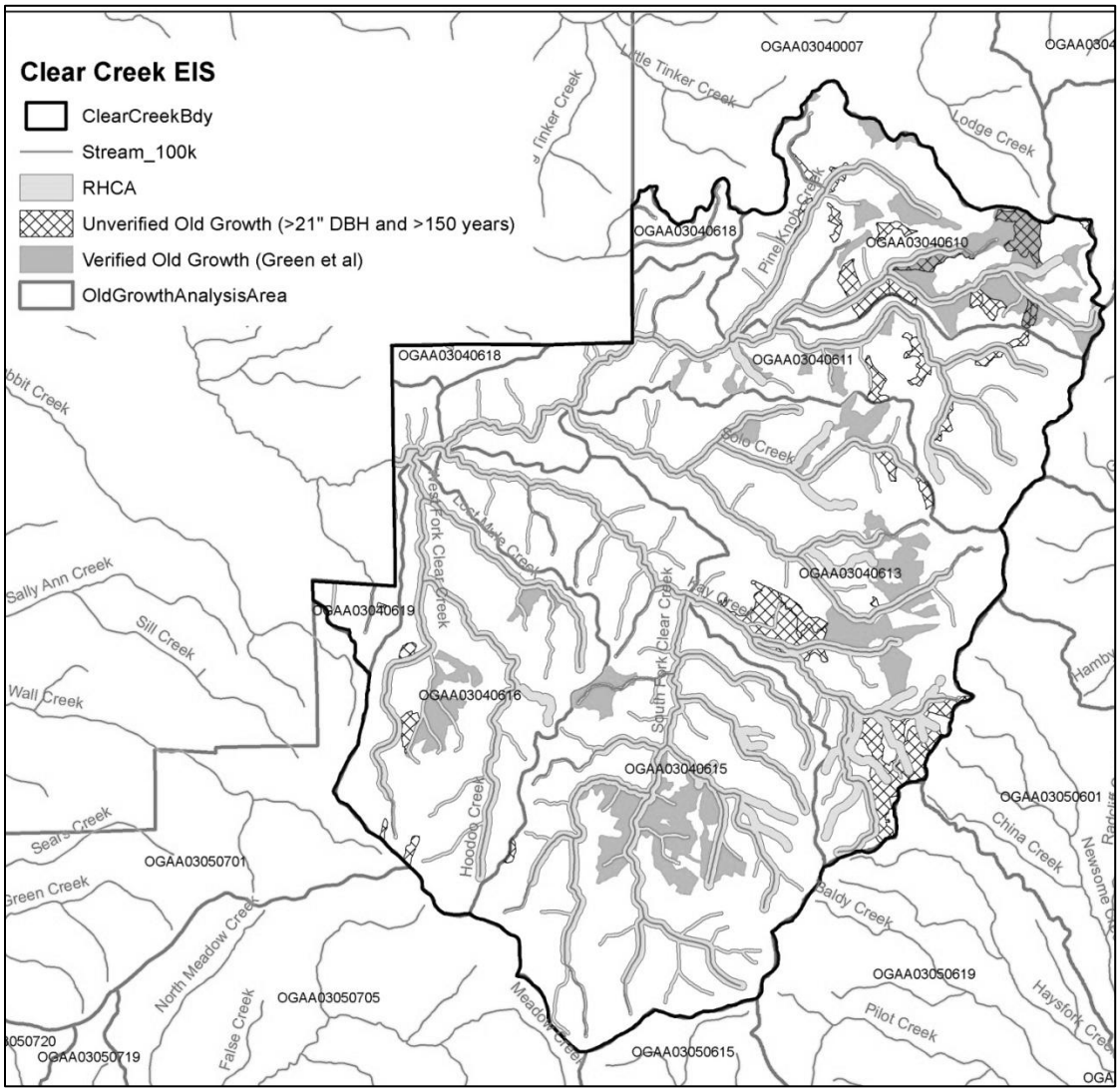

Figure 3-7. Clear Creek verified and unverified old growth

The project area contains 11% verified old growth, which meets the Forest Plan standard. A total of 31 verified old-growth patches, ranging from 7 to 987 acres, exist within the OGAAs. Sixteen percent of the patches exceed the preferred 300-acre size, 28% are at least 150-acre core areas, 13% are between 50 and 150 acres, and 42% are <50 acres. Most of the small patches (<50 acres) are effectively enlarged by the adjacent RHCAs, which also provide linkages between all old-growth patches. This facilitates dispersal of old growth–associated species.

Additional old-growth forest is present in each of the OGAAs but has not been verified by recent stand exams. Stand data (TSMRS) show an additional 1,722 acres (4%) over 150 years old and over 21 inches average dbh. Table 3-19 and Figure 3-7 show the unverified old growth in each OGAA. Additionally, 24% of the analysis area is contained within RHCAs, which would be managed for future old growth.

Table 3-19. Unverified old growth in each Old-Growth Analysis Area (OGAA) in the Clear Creak analysis area

Old-Growth Analysis Area	Old-Growth Analysis Area Acres	Unverified Old Growth	
		Acres	Percent (%)
40610	5,665	385	7
40611/618	7,935	178	2
40613	9,765	1,062	11
40615	12,928	0	0
40616/619	7,373	97	1
Total	43,666	1,722	4

Direct, Indirect, and Cumulative Effects

Alternative A—No Action

Alternative A would not affect MA 20 or old-growth forest habitats, because no activities would be conducted. Fire suppression would continue. Risk of large-scale stand-replacing fire would increase; the size or severity of such an event cannot be predicted.

MA 20 and old-growth habitats would continue to be altered by natural events such as succession, insect and disease, and wildfire. Some mixed-conifer habitats would mature and develop old-growth habitat characteristics, including multiple canopies, snags, and large downed wood, which provide habitat for a variety of wildlife species. Canopy openings created when snags fall would allow sunlight to reach the forest floor, providing for shrub, forb, and grass growth, which would become forage for ungulates and small mammals.

The risk of a crown fire would increase with increasing surface and ladder fuels. A wildfire would create large numbers of snags and would initiate young forest conditions. Canopy cover would be lost in varying amounts. A fire would reduce the amount of old-growth habitat available to species such as fisher, pileated woodpecker, goshawk, and American marten.

If no fires occur, cumulative effects on MA 20 would be an increase in the amount of suitable old growth as stands age. A negative cumulative effect would occur in the event of a wildfire

that removed old-growth habitat. Predicting the size and severity of wildfire is not possible, so the level of potential cumulative effects cannot be determined.

Alternatives B, C, and D

The direct, indirect, and cumulative effects are analyzed for each of the 7 OGAAs. The time frame for cumulative effects is 150 years, which is the time required for stands to develop into old-growth habitat.

Forest Plan MA 20 would be allocated to 4,654 acres of verified old-growth habitat, which would meet Forest Plan old-growth standards. No treatment would occur in allocated MA 20 under any alternative; therefore, no direct effects to the resource would occur. MA 20 would continue to be altered by natural events, such as succession, insects and disease, and wildfire, under any action alternative. Habitat would remain available for fisher, American marten, pileated woodpecker, and northern goshawks (old growth–associated species). PACFISH buffers would provide for current and future old growth and would provide connectivity between old-growth patches and uplands. Thinning stands adjacent to old growth would increase their resilience to insects and disease, which would increase their survival and development into larger patches of future old growth.

Stand-replacing fire risk would be reduced on 7% of the analysis area through project activities. This could benefit MA 20 by making the landscape more resilient to wildfire and reducing the likelihood of stand-replacing fire in old-growth habitat. There could be a slightly positive cumulative effect to MA 20 when combined with fire suppression.

The Forest plan states, “Where possible, roads should not be located through or adjacent to old-growth stands in order to reduce human disturbance, loss of snags to firewood cutters, windthrow, and micro-climate changes” (USDA Forest Service 1987b, page N-2). Alternatives B and C build 2 miles and Alternative D builds 1mile of temporary roads through old-growth habitats. The average length is 0.1 miles. Road building would remove an average of 0.4 acres of vegetation on 17 road segments under Alternatives B and C and on 13 segments under Alternative D; the total amount of old growth disturbed by temporary roads would be 7 acres and 5 acres, respectively (or 0.1% of all verified old growth). The largest impact would be removal of large green and dead trees, but the effects would be indistinguishable when compared to natural diversity and openings in old-growth habitats. The roads would be decommissioned after use. Temporary roads would cause no cumulative effects to MA 20.

3.6.6 Environmental Consequences

3.6.6.1 Direct and Indirect Effects at the Treatment Unit Scale in terms of Eco-setting

As noted above, the analysis area for direct and indirect effects of the alternatives is the project area.

3.6.6.1.1 Alternative A—No Action

Under the No Action alternative, no project activities would be conducted to maintain forest health or maintain resiliency. Activities to restore forest vegetation or increase its resilience

would not be implemented. Two general trends would be expected to occur (Cooper et al. 1991; Smith et al. 1997).

The Uplands make up 65% of the project area. The short-term effects of the No Action alternative would include increased mortality of Douglas-fir and grand fir as stands continue to mature and experience in-stand competition, root diseases, and decay. In addition, insects would continue to cause deterioration of stands dominated by these species.

The amount of existing early seral tree species in the project area would decline. The amount of medium and large size classes would decline as root disease and insects cause mortality. Grand fir and cedar would occupy the growing space left by the mortality of other species; stands would increasingly become dominated by grand fir and cedar (Byler and Hagle 2000). In the absence of natural disturbance such as fire, regeneration to fill gaps in the canopy would be limited to the same species of the current overstory, because white pine, western larch, and ponderosa pine will have limited seed sources. Douglas-fir would also gradually become less prevalent due to root disease and bark beetle mortality.

Stands would continue to grow, and the diameters of trees would increase; however, the rate of this growth would slow as overstory trees die and are increasingly replaced by understory (smaller-diameter) trees. Canopy cover would remain about the same, as vertical structures would continue to move the remaining single- and two-storied stands to three-storied stands and continuous-storied stands due to mortality. The landscape would become more homogeneous, with continuous vertical structures and multiple ages (Byler and Hagle 2000). Stands would develop old-growth characteristics over time; however, when compared to similar areas 100 years ago, these stands would have fewer long-lived early seral species, more vertical structure, and multiple ages earlier in their successional development. The landscape would increasingly become less resilient to change or disturbances. Overall, while the numbers represented by current conditions are closest to desired conditions, the indirect effects of the No Action Alternative and the combination of species compositions, landscape arrangement, and structures would trend more areas to lesser health, less resistance, and less resilience than the current condition or desired conditions.

The young age class (0–40 years) would continue to be underrepresented. Most stands currently within this age class will shift to the next age class (40–100 years) within 5 years.

The Breaklands represent about 33% of the project area and contain a combination of Douglas-fir and dry grand fir habitat types, mostly on south-facing Breaklands. Indirectly, the No Action alternative would lead to increased grand fir and Douglas-fir as mortality in long-lived, early seral species continues due to competition and insects. Douglas-fir would not necessarily become less prevalent on the driest sites (because the lack of moisture limits natural regeneration of other species). Growing space opened by the Douglas-fir beetle mortality over the last decade would likely become grand fir and Douglas-fir, as that is the only seed source. This would continue as other disturbance agents cause mortality. Even if fire were to create sites for regeneration of long-lived early seral species of ponderosa pine, western larch, and western white pine, the lack of seed source would greatly limit this regeneration.

The effects on stand growth rate, canopy cover, vertical structure, old-growth development, and overall stand health and resilience would be the same as the effects described for the Uplands setting, above.

General Trends Common to All Eco-settings under the No Action Alternative:

- A substantial decrease in the young age class within the next 5 years
- An increase in multi-storied, multi-aged stands within stand structure due to the effects of root disease and bark beetles resulting from a continued absence of fire
- Continued increase of shade-tolerant cover types with the loss of shade-intolerant cover types
- An increase in the amount of mature structure
- A decrease in overall resistance, resilience, and response to ecological disturbance agents

3.6.6.1.2 Alternatives B, C, and D

Overview of Vegetative Aspects of the Proposed Action

Table 3-20 displays the proposed vegetative management activities for each alternative, including activities proposed for Focus areas and activities proposed for other land within the project area.

Table 3-20. Acres of proposed vegetative management activities, by alternative

Activity	Alternative B	Alternative C	Alternative D
Within Focus Areas			
Regeneration (acres)	2,609	3,995	2,017
Commercial thin (acres)	2,240	854	1,997
Precommercial thin (acres)	998	998	998
Burn (acres)	1,371	1,371	1,371
Improvement (acres)	331	331	211
Restoration (acres)	41	41	41
Retention (acres)	3,940	3,940	4,892
Outside of Focus Areas			
Regeneration (acres)	0	161	161
Commercial thin (acres)	3,366	3,366	3,144
Precommercial thin (acres)	889	889	889

The main goal of the project is to reintroduce disturbance patterns that would mimic the natural disturbance that would be typical in a landscape where fire would have been the primary disturbance agent. Historically, the most common fire regimes of the habitat types and VRUs located within the project area were lethal burns and mixed-severity fire (Smith and Fisher 1997).

The project is designed to utilize existing small patches of young trees to create larger patches of young trees by implementing variable retention regeneration methods in appropriate adjacent stands, thinning through younger stands, and retaining 100% of the trees in some areas.

Structure classes in areas designed as full retention would not change, because the harvesting would not occur and incursions of prescribed fire into these areas would be minimal and classified as low-severity.

All activities would occur within the Focus areas. The activities were designed to create a disturbance pattern that is similar to the size and scale of what historically would have been a mixed-severity fire. The location of the Focus areas was intended to utilize the existing young forest and the existing transportation system.

Regeneration harvest is used when stands have mortality rates that are higher than growth rates, either due to age or pathogens. Following harvest, stands receive site preparation and are reforested with long-lived early seral species that will increase resistance and resilience at the stand level and begin to trend the project area toward resistance and resilience. Management activities that favor resistant tree species on sites that are prone to or infected with root disease would be utilized (Rippy et al. 2005; Byler and Hagle 2005; Hagle 2006).

Treatment priorities were based on DFCs and take into consideration the VRUs and habitat types, landscape species, and structure objectives of the project area. Components within harvest areas that meet overall objectives (desired conditions) would be retained; where not present they would be established. Variability will be substantial within treatment areas because the amount of retention would be based on available components (large trees, preferred species, etc.). Wildlife, fire/fuels, and visual concerns played a prominent part in maximizing retention on sites while trending the overall area toward the DFC.

3.6.6.2 Direct, Indirect, and Cumulative Effects of the Alternatives

Indicators focus on characteristics that contribute to forest health. Indicators are compared to the desired conditions. The desired conditions would trend the landscape toward increased ecological resistance and resilience to reasonably expected disturbances (e.g., fire, insects, disease, and weather). Analysis indicators are the same for direct, indirect, and cumulative effects. Indicators to be discussed in this section include forest composition, age class, vertical structure, and patch size. Current conditions reflect all past natural disturbances and management activities, and while this discussion considers those current conditions, it will only specifically address the effects of the action alternatives.

3.6.6.2.1 Direct Effects at the Treatment Unit Scale

Variable Retention Regeneration System (clear-cut with reserves) would establish and grow site-adapted western larch, white pine, and ponderosa pine while maintaining available and healthy western larch and ponderosa pine and groups of other species. Characteristics of the variable retention system units include the following:

- All action alternatives would be similarly distributed on the following VRUs: VRU 3 (5%), VRU 7 (7%), VRU 8 (29%), VRU 10 (4%), and VRU 17 (55%).
- Alternative B proposes 73% of the regeneration harvest in the grand fir/Douglas-fir cover type, Alternative C 78%, and Alternative D 75%.
- 45% of all the treatment areas are in the 41–100 (years) age class, while 30% of the treatment areas are in the 101–149 (years) age class

The treatment areas would resemble a mosaic of even-aged groups after harvest and planting activities are completed. Overall residual tree retention would range between 14 and 28 tpa,

based on a 12-inch dbh tree. Retention of biological legacy trees, both as individuals and small groups of trees and as undisturbed forest patches, is consistent with the goals of variable retention harvesting as described by Franklin et al. (1997) and Franklin and Johnson (2011). Variable retention harvesting type methods have also been discussed in Graham and Jain (2005), Jain and Graham (2007), and Franklin et al. (1997).The best available representative western white pine, western larch, and ponderosa pine would be retained to serve as shelter and, in some cases, a seed source. Some level of shelter is needed on harsh sites to ensure regeneration success. Retained trees would remain over the long term for structure and would result in stands with two-storied vertical structure. Species composition would meet desired conditions following reforestation. Prescribed fire would be used to prepare sites and reduce shrub competition so that planted seedlings could be established. Prescribed fire would also reduce post-harvest fuel loading.

Intermediate (Thinning) Treatments will not directly affect species composition, age class, or patch size at the unit scale. These treatments will, however, shift all the acres that have been treated to the single- or two-storied vertical structure (Table 3-21).

Table 3-21. Summary of effects (in acres) at the unit scale

Issue Indicator	Current Condition Alternative B (acres)	Current Condition Alternative C (acres)	Current Condition Alternative D (acres)	Alternative B Following Treatment (acres)	Alternative C Following Treatment (acres)	Alternative D Following Treatment (acres)
Forest Composition						
Early seral	334	368	309	1,863	2,954	1,563
Not early seral	2,185	3,694	1,792	656	1,108	538
Forest Structure						
Age Class						
0–40	70	526	172	1,848	2,539	1,578
41–100	1,116	2,199	955	335	660	286
101–149	879	882	648	262	265	194
150+	547	547	405	164	164	122
Vertical Structure						
1- & 2-Storied	2,263	3,594	1,922	2,263	3,594	1,922
3-Storied & Continuous	255	467	179	255	467	179

Note: Shifts in forest structure are based on Forest Vegetation Simulator Model runs.

Direct and Indirect Effects at the Resource Area Scale

Forest Composition: The project area is currently not within the desired range for forest composition. The composition within the project area is currently high in grand fir and red cedar and low in long-lived early seral species. Existing western larch would continue to decline due to inter-stand competition, while ladder fuels would continue to accumulate around existing ponderosa pine. The action alternatives would decrease the grand fir and red cedar dominance type and maintain/increase existing long-lived early seral species while reestablishing them in areas where they are currently underrepresented. Table 3-22 and

Table 3-23 represent the extent to which the action alternatives would shift species composition from the existing condition.

Table 3-22. Existing condition, desired range, and shift in species composition for the action alternatives in the Breaklands

Breaklands (33%) (Vegetation Response Units 3, 8, 12)					
Dominance Type	**Desired Range (%)**	**Existing (%)**	**Alternative B (%)**	**Alternative C (%)**	**Alternative D (%)**
PP/WL/WP	**20–40**	**11**	**17**	**18**	**15**
Douglas-fir	**15–30**	**32**	**29**	**28**	**30**
Lodgepole pine	**0–5**	**<1**	**<1**	**<1**	**<1**
Cedar/grand fir	**9–17**	**54**	**47**	**46**	**48**
Spruce/fir mix	**0–5**	**2**	**2**	**2**	**2**
Alpine fir/ Mt. hemlock	**0**	**0**	**0**	**0**	**0**
Seral grass/shrub	**8–15**	**7**	**7**	**7**	**7**
Non-forest	**10**	**0**	**0**	**0**	**0**

Table 3-23. Existing condition, desired range, and shift in species composition for the action alternatives in the Uplands

Uplands (65%) (Vegetation Response Units 7, 10, 17)					
Dominance Type	**Desired Range (%)**	**Existing (%)**	**Alternative B (%)**	**Alternative C (%)**	**Alternative D (%)**
PP/WL/WP	**15–30**	**8**	**13**	**17**	**14**
Douglas-fir	**10–15**	**15**	**13**	**12**	**13**
Lodgepole pine	**20–30**	**4**	**4**	**4**	**4**
Cedar/grand fir	**25–50**	**59**	**56**	**53**	**55**
Spruce/fir mix	**0–5**	**7**	**7**	**7**	**7**
Alpine fir/ Mt hemlock	**0**	**<1**	**<1**	**<1**	**<1**
Seral grass/shrub	**0–5**	**6**	**6**	**6**	**6**
Non-forest	**3**	**0**	**0**	**0**	**0**

Age Classes: The action alternatives increase the younger age classes while slightly reducing the older age classes and maintaining the oldest age class. The oldest age class is currently well represented. Managing for long-term resistance and resilience within the project area would help maintain existing structure development into the older age classes. Table 3-24 depicts the shift in the young age class, as this is the only age class that can realistically be managed. The time frame for the direct effects to occur would be within 5–10 years. Based on this temporal scale, the analysis includes the existing condition (2012) and 5 years into the future, when implementation is expected to take place. This is an important distinction, as current condition for some VRUs would show they are well within the DFC for the young age class; however, after 5 years many of the acres in the young age class shift to the next age class (leaving them outside of the DFCs). Additionally, comments from the public during scoping expressed concern about a deficit of the very young (brush and seedling) stage. This

deficit is a reality, as 1,575 acres of the project area are in the 0–19 age class. VRU 10 contains minimal activity acres, which are insignificant at the resource area and VRU scales and are not shown in Table 3-24.

Table 3-24. Shift in the young age class (in acres), by alternative and Vegetation Response Units (VRU)

VRU	Alternative A	Alternative B	Alternative C	Alternative D
Breaklands	**VRU 3 (Desired Range = 450–750 acres)**			
0–40 Age Class (2012)	195	296	371	221
0–40 Age Class (2017)	142	206	318	168
	VRU 8 (Desired Range = 1,700–2,800 acres)			
0–40 Age Class (2012)	1,037	2,028	2,190	1,701
0–40 Age Class (2017)	909	1,900	2,062	1,579
Uplands	**VRU 7 (Desired Range = 250–500 acres)**			
0–40 Age Class (2012)	664	917	1,091	903
0–40 Age Class (2017)	590	843	1,017	829
	VRU 17 (Desired Range = 2,000–4,100 acres)			
0–40 Age Class (2012)	4,177	5,430	6,526	5,409
0–40 Age Class (2017)	2,744	3,997	5,093	3,973

Vertical Structure: Vertical structure is important when describing some types of wildlife habitat, fuel ladders and fire spread, and successional development. The vertical structure of the project area is well within desired condition. Vertical structure at this scale would not be changed by the action alternatives since all treatments would maintain a single- or two-storied vertical structure.

Patch Size: The desired condition strives for patch sizes from hundreds of acres up to 1,000 acres. Minimum patch sizes would be 50–500 acres, with variable retention and connectivity where possible. The current condition does not have patches of the desired size in any of the structural stages. Table 3-25 displays the shift in average patch size by successional stage. The action alternatives would decrease the later successional stages and increase early successional stages. The increase in patch size for the young-successional stage (stand initiation) would enable the establishment of long-lived early seral species where appropriate, which would increase long-term resilience and potential to desired patch sizes in the future. Locating regeneration treatments next to existing young forest leads to an increase in patch size among all of the structural classes.

Table 3-25. Shift in average patch size by successional stage, by alternative

Structural Class	Existing		Alternative B		Alternative C		Alternative D	
	Percent of Analysis Area (%)	Existing Mean Patch Size	Percent of Analysis Area (%)	Mean Patch Size	Percent of Analysis Area (%)	Mean Patch Size	Percent of Analysis Area (%)	Mean Patch Size
Seral shrub	7	41	6	252	6	252	6	252
Stand initiation	17	17	25	96	26	104	25	91
Stem exclusion	26	13	20	131	20	119	21	128
Understory reinitiation	17	23	20	83	18	83	18	83
Young multi-story	3	20	2	26	2	904	2	26
Old single-story	17	20	16	116	17	121	16	116
Old multi-story	13	34	11	81	11	72	11	81

Commercial Thinning: The objectives for commercial thinning are to maintain and/or improve diameter/tree growth with stocking control. Alternative B proposes 2,240 acres of commercial thinning inside the Focus areas, Alternative C proposes 3,995 acres, and Alternative D proposes 2,017 acres. This management activity was designed to mimic an underburn as part of a mixed-severity fire disturbance pattern. Outside of the Focus areas, Alternatives B and C propose 3,366 acres of commercial thinning, and Alternative D proposes 3,144 acres. All action alternatives were designed to address the issue of stands not reaching the culmination of mean annual increment; the action alternatives take advantage of thinning opportunity while maintaining and improving stand growing conditions. Approximately 40%–60% of the overstory would be removed, leaving the largest, healthiest ponderosa pine, western larch, white pine, Douglas-fir, and grand fir.

Treatment would result in a slight improvement in species composition compared to the No Action alternative but would not meet desired conditions. Stand structure would be much as it is now, with a reduction of the intermediate trees competing with the overstory. Fuel loading would be roughly the same, although canopy base height would be raised and canopy bulk density reduced. Mortality due to insects and disease would continue to change canopy and structure over the long term, with areas needing consideration for regeneration treatment in the next few decades. Gradual changes to growing space and conditions would favor regeneration of Douglas-fir and grand fir.

Precommercial Thinning: All action alternatives allocate the same amount of acreage for precommercial thinning. The effects would be similar to the effects of commercial thinning. Early seral species would be retained, improving species composition by reducing competition and improving growing space. Approximately 200–300 tpa would remain following treatment.

Improvement cutting: Improvement cutting is proposed in stands with an existing component of large, old ponderosa pine and western larch. In the absence of fire, these stands

have substantial amounts of understory in-growth composed of grand fir and western redcedar. Improvement cutting would affect within-stand structure in much the same manner as commercial thinning does. The lower canopy would be reduced more than in a commercial thin, due to the focus on maintaining the large relic trees, reducing ladder fuels, and creating enough spacing to allow ground fire and prevent crown fire. This would increase the amount of air movement through the affected stands and increase the amount of sunlight reaching the forest floor relative to the existing condition of the stands. These two factors would increase the rate of drying of dead and down fuels during the summer months and may stimulate additional growth of understory herbs, shrubs, and shade-tolerant conifer regeneration. Slash and other dead and down fuels would be reduced through underburning following harvest. Underburning would also reduce ladder fuels, further increasing the distance between the ground and the base of the live overstory canopy. Improvement cutting typically increases the growth rate of the residual stand of trees. However, improvement cutting may also increase the rate of infection by root diseases in residual Douglas-fir and grand fir, because stumps and their attached root systems would become readily available for colonization by fungi that cause root disease. Included stands would have an even-aged overstory that may be uniformly distributed throughout the stand or may be clumpy and somewhat irregular where clumps of healthy white pine, western larch, or ponderosa pine are retained.

Planting of ponderosa pine, western larch, and/or western white pine may occur wherever pre-harvest mortality has resulted in the development of small openings in the improvement cuts. This planting would improve the long-term species diversity of the overstory and the long-term resilience of the stand(s).

Burning: See fuels specialist report.

Restoration: Restoration is proposed on dry, upland grassland habitats and on moist inclusions (historically dominated by shrubs). Patch sizes are limited by aspect and coniferous vegetation. Invasive forbs and grasses have been introduced and are becoming dominant. Historically, very frequent (5- to 20-year intervals), low-severity fire maintained open grasslands and rejuvenated shrub habitats. Ponderosa pine and an occasional Douglas-fir occur incidentally. Restoration activities would include herbicide application and prescribed fire for site preparation, followed by seeding of native species.

3.6.6.3 Cumulative Effects

The cumulative effects analysis area will be the entire 65,000-acre Clear Creek watershed. This area includes federal, state, and private lands. Cumulative effects will be analyzed15 years after project implementation. Regeneration harvest areas would be certified stocked within 5 years. However, by 15 years, the stand would be moving out of the plantation seedling/sapling stage and establishing tree dominance at the sapling/pole stage.

Past regeneration and intermediate timber harvests on the Forest were the only activities on federal lands considered for cumulative effects. No other present or foreseeable management activities on federal lands would affect vegetative composition, structure, arrangement, or disturbance types at the stand scale or at larger scales. Vegetative conditions on State and private lands were considered and reviewed using VMap. The Clear Creek watershed includes 24,235 acres of State or privately owned land, all of which is downstream from federal lands. Roughly 10,400 acres are in the grass or shrub cover type. The remainder is in

a mixed grass/forest or forest cover type. Future timber harvest on forested private lands adjacent to the project area is expected. The Idaho Department of Lands (IDL) provided information regarding upcoming State and private harvest proposals. One private proposal involves harvest timber, but no acres were provided. The acres are expected to be small, since land ownership in the area appears as many houses on small (<100-acre) lots. The focus of harvesting on small, private ownerships is often salvage and/or partial harvest to remove dead/dying trees and/or trees of high economic value. The IDL is also proposing a 160-acre seed tree (regeneration) harvest directly adjacent to the Forest boundary and one of the proposed project harvest units (Unit 123). This harvest would remove most of the trees but would retain an average of 8 seed trees per acre.

3.6.6.3.1 Species Composition

Alternative A—No Action

The cumulative effect of this alternative would continue the long-term trends in loss of early seral species composition. This alternative would allow the continued decline of the remaining ponderosa pine and western larch present in these stands. Harvest activities on private and State lands would not contribute toward the establishment of early seral species, since both rely on natural regeneration to restock the stands. Shade-tolerant grand fir, cedar, and Douglas-fir typically regenerate on these sites.

Alternatives B, C, and D—Action Alternatives

All of the action alternatives trend the project area toward the DFC by creating openings large enough to establish long-lived early seral species at a scale that is large enough to measure. Alternative C trends toward the desired conditions the most, while Alternative D trends the least. Harvest activities on private and State lands would not contribute toward the establishment of early seral species, since both rely on natural regeneration to restock the stands. Shade-tolerant grand fir, cedar, and Douglas-fir typically regenerate on these sites. Therefore, no cumulative effects would occur at the analysis area scale.

3.6.6.3.2 Age Class

Alternative A—No Action

This alternative would have no effect on age class in the project area. The area would continue to be dominated by mid- and late-seral shade-tolerant species with a lack of young structure. Insects and disease would continue to be the major agents of change, resulting in multi-aged stands with continuous ladder fuels. Harvest on State lands would increase the young age class by 160 acres, which at the analysis scale would have no measurable effect. Since no federal activities are proposed under this alternative, no cumulative effects to age class would occur.

Alternatives B, C, and D—Action Alternatives

The action alternatives increase the younger age classes while reducing the mature age classes and maintaining the oldest age class. The oldest age class is currently well represented. Managing for long-term resistance and resilience within the project area would help maintain existing structures develop into the older age classes. Placement of the

proposed regeneration treatments next to existing stands of young forest helps trend the analysis area toward the desired condition. Regeneration harvest on state land adds 0.2% toward the DFC for younger age class.

3.6.6.3.3 Vertical Structure

Alternative A—No Action

Although the vertical structure of the resource area is well within desired condition, the stands proposed for regeneration treatment are in the stem exclusion phase. They are currently transitioning into the understory reinitiation and a multilayer condition due to age and natural change agents. The No Action alternative would ultimately result in an area dominated by stands with continuous vertical structure, causing the area to eventually fall out of the range for DFCs.

Alternatives B, C, and D—Action Alternatives

All the action alternatives would continue to maintain the desired range for single- and two-storied stand conditions through regeneration, intermediate harvest, and precommercial thinning. Regeneration harvest on State lands would also maintain these conditions. Cumulatively, a slight positive effect to vertical structure would occur.

3.6.6.3.4 Patch Size

Alternative A—No Action

This alternative retains the existing patch sizes, which are and would remain, on average, small and fragmented. No activities are proposed that would alter patch size on federal lands. The proposed 160-acre IDL harvest would not contribute to increases in patch size on federal lands. Since no activities are proposed under this alternative, no cumulative effects to patch size would occur.

Alternatives B, C, and D—Action Alternatives

All action alternatives increase average patch size across all structural stages and reduce the number of patches overall within the area. All action alternatives trend the area toward the DFC by increasing patch size of existing older forest and increasing the representation of long-lived early seral species in new large patches. The harvesting on State land would contribute only slightly to increasing patch size in the cumulative effects analysis area by creating new openings adjacent to existing openings.

3.7 WILDLIFE

This section summarizes the effects of the alternatives on the management of wildlife resources. This section was summarized from the "Clear Creek Restoration Project Wildlife Report," located in the project file.

3.7.1 Analysis Area

Direct, indirect, and cumulative effects analysis areas considered home range size, mobility, habitat requirements, habitat availability, and habitat quality of the analyzed species. In most cases, the direct, indirect and cumulative effects analysis area is the 43,700-acre project area

which includes all proposed activity areas. It is large enough to assess the effects of proposed activities, but not so large as to make habitat changes undetectable. Effects were based on the acres of potential habitat treated by proposed activities. The timeframe for direct and indirect effects is 5 years, which is the estimated time needed to complete harvest activities. For old-growth, elk, and lynx predetermined analysis units were used as required by Regional or Forest Plan direction. There are 7 old growth analysis areas 7 elk analysis areas (EAAs), and a small portion (3,300 acres) of one 24,000 acre lynx analysis unit in the analysis area.

The analysis area includes 43,700 acres of National Forest within the upper two-thirds of the Clear Creek drainage which includes the 9200 acres (21%) Clear Creek Roadless Area. The roadless nature of this area provides secure habitat for many species, such as wintering elk herds, which are dependent on more remote, isolated environments with relatively little human disturbance.

Terrestrial environments in the area are diverse and provide habitat for many birds, mammals, reptiles, and amphibians. Wildlife habitat is dominated by grand fir and western red cedar at mid-elevations (91%). Open, dry ponderosa pine/Douglas-fir forest, dry and moderately moist grand fir/Douglas-fir forest, and grasslands comprise 8% of the lower elevation, more westerly portions of the area. Cool subalpine forests in the headwaters make up the remaining 1% of the area.

The primary ecological settings in the area are the Idaho Batholith Breaklands, Idaho Batholith Uplands, and Idaho Batholith Subalpine. The Subalpine setting is found on only 160 acres, has no treatments proposed in it, and will therefore not be addressed in this assessment.

The Breaklands provide a variety of forest conditions that offer a mix of forage and cover for wintering big game and many forest raptors. Large trees, especially western larch, Douglas-fir, western red cedar, grand fir and some ponderosa pine, provide habitat for a variety of cavity-using species. Fires and endemic insect infestations also provide a continuous supply of standing snags for wildlife nesting and feeding.

Young forests are essential for providing quality elk and white-tailed deer winter browse. Preferred browse species include redstem ceanothus, mountain maple, scouler willow, and service berry. These are associated with mixed-coniferous forests and are adapted to, and thrive following, dry-season (summer/fall) fire. North-slope habitats provide mid-seral and mature forest habitats for northern goshawk. Southerly exposed habitats provide mature, open-forest conditions for flammulated owls. Large patches of mature and old-forest habitats throughout provide nesting and foraging habitats for pileated woodpecker. Large standing/down dead wood levels typically range from 7 to 13 tons/acre.

Sensitive and Management Indicator Species that would benefit the most from achieving the desired vegetation conditions on the breaklands include the flammulated owl, pygmy nuthatch, goshawk, pileated woodpecker, and elk summer and winter range.

The Uplands provide young-forest habitats that offer quality elk and deer spring, summer, and fall forage. Plant communities with Pacific yew are a key moose winter browse. Moose favor mature grand fir forest habitats with a closed tree canopy and moderate snow depths. Moose also successfully forage in shrub habitats commonly following stand-initiation disturbances.

Large patches of mature- and old-forest provide nesting and foraging habitats for pileated woodpecker and denning and prey habitats for fisher and American marten. Mid-seral and mature-forests provide habitat for northern goshawk. Infrequent wildfires favor the accumulation of large standing/down dead wood, which typically range from 20 to 40 tons/acre.

Standing snags provide roosting habitats for several Sensitive bat species (fringed, long-legged, and long-eared myotis) as well as foraging and nesting habitat for a variety of birds. Large downed wood provides cover, foraging, and denning habitats for Sensitive western toads and ringneck snakes. Endemic populations of black-backed woodpeckers would be sustained across the landscape by dying and recently dead (less than 6 years since tree death) standing trees (USDA Forest Service 2007a).

Sensitive and Management Indicator Species that would benefit from achieving the desired vegetation conditions in the Uplands include the American marten, fisher, moose, elk winter range, pileated woodpecker and goshawk.

3.7.2 Regulatory Framework

3.7.2.1 Nez Perce Forest Plan

The 1987 Forest Plan documents goals, standards, objectives, and guidelines for managing Forest wildlife species and habitats. Project related Forest Plan wildlife standards and objectives are displayed in Table 3-26. The Proposed Action complies with the Nez Perce National Forest Land and Resource Management Plan requirements relevant to wildlife species and their habitats (Table 3-26).

Table 3-26. Forest plan compliance—wildlife resources

Standard Number	Forest Plan Standards Subject Summary	Compliance Achieved By
1	Maintain viable populations of existing native and desirable non-native vertebrate wildlife species	Viable populations would continue to be maintained in the project area and on the Forest.
5	Coordinate with the Idaho Department of Fish and Game to achieve mutual goals for fish and wildlife.	The Forest continues to work with the IDFG in managing wildlife species and their habitat. IDFG has a representative on the project ID Team.
6	Use "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to manage for and to assess the attainment of summer elk habitat objectives in Project evaluations (Appendix B).	The Forest uses these guidelines to assess existing condition and effects of Project alternatives. This Project was analyzed using the Guidelines (see Elk section).
7	Provide management for minimum viable populations of old-growth and snag dependent species by adhering to the standards stated in Appendix N.	Old-growth standards would be met or exceeded with this Project. Snag standards would be met or exceeded. See Chapter 2 Design Measures.
10	Maintain or improve elk habitat at, or near, optimum levels by applying elk guidelines in key wolf areas outside wilderness.	Elk forage production would increase by implementing this Project. Elk guidelines were applied to wolf habitat in the Project area.
11	Design timber harvest activities in moderate and high elk objective areas, when compatible with established fish/water quality objectives and economics, so that units at the far end of the road will be cut first.	Harvest units are dispersed throughout the Analysis Area. Units at the far end of roads would be harvested first when compatible with fish/water objectives and economics (Chapter 2, Design Measures).
13	Consult with IDFG and USFWS to determine management of known or suspected initial wolf home sites.	Correspondence with IDFG and USFWS occurred with this Project. No known or suspected wolf home sites occur in the Analysis Area.
Standard Number	**Forest Plan Amendment 20 Subject Summary**	**Compliance Achieved By**
FW 1	Design and implement fish and wildlife habitat restoration and enhancement that contributes to Riparian Management Objectives	This Project implements Forest Plan Amendment 20 (PACFISH).
Objective	**Forest Plan Objective Subject Summary (FP page II-5 & II-6)**	**Compliance Achieved By**
Page II-5	Road access and timber sale scheduling will be coordinated to achieve the elk summer habitat objectives. The Forest-wide goal is to manage for at least 75, 50, and 25% habitat effectiveness in the high, moderate, and low areas, respectively.	The "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" (Leege 1984) was used to determine objectives have been achieved in the affected elk analysis unit.
Page II-6	[Pacific yew] communities will be managed under appropriate silvicultural prescriptions to maintain habitat for existing and slightly increased moose populations. Road access will be controlled during fall and winter to reduce harassment and poaching.	The Project has been designed to comply with this objective in MA 21 (Chapter 2, Design Measures). There would be no permanent road construction. There are no access management changes proposed.
Page II-6	Viable populations of old-growth-dependent species will be maintained.	No MA 20 old-growth habitat would be harvested. Riparian habitat conservation areas would be protected. Snag and large down wood retention would meet minimum Region 1 guidelines.

Standard Number	Forest Plan Standards Subject Summary	Compliance Achieved By
Page II-6	Habitat will be maintained to provide for population viability of all sensitive species…Important habitat components include riparian zones, caves, mine shafts, snags, and large open waters. Management actions will acknowledge and protect other key habitat components important to these species as they are discovered and accepted.	Riparian habitat conservation areas are protected by implementing PACFISH/land management plans, there are no caves, mine shafts or open water bodies in the Project area. Snag and large down wood retention would meet minimum Region 1 guidelines. No old-growth habitat would be regeneration harvested. See Chapter 2, Design Measures.

3.7.2.2 Endangered Species Act of 1973

This act directs that actions authorized, funded, or carried out by federal agencies do not jeopardize the continued existence of any threatened or endangered species, or result in the adverse modification of habitat critical to these species. It is also the responsibility of the Forest Service to design activities that contribute to the recovery of listed species in accordance with recovery plans developed as directed by the ESA (50 CFR part 402). Section 9 of the ESA of 1973, as amended, requires threatened and endangered species be protected from "harm" and "harassment" wherever they occur, regardless of recovery boundaries. This Project analyzed effects to Canada lynx, the only listed wildlife species in the Project area. All Action Alternatives are consistent with the Northern Rockies Lynx Management Direction (NRLMD) and are in compliance with the ESA and FSM 2670. Informal coordination with the USFWS on this Project was initiated on September 28, 2012.

3.7.2.3 National Forest Management Act

This act requires the Forest Service to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives (16 USC 1604(g)(3)(B)). The Forest Service's focus for meeting the requirement of NFMA and implementing its regulations is on assessing habitat to provide for diversity of species. All alternatives would be consistent with NFMA direction for diversity of animal communities. Although the Action Alternatives analyzed in the Project may impact individual animals, the Project would not affect the viability of any species across its range. The Vegetation Section discusses the distribution of age classes (successional stages) and shows the Project area is trending toward historic distributions of each successional stage. Design measures (Chapter 2) were developed to retain elements of diversity (green trees, snags, and large down wood) in harvested areas. Additionally, there would be no timber harvest in RHCAs or MA 20 (old growth).

Sensitive Species: Sensitive wildlife species are those that show evidence of a current or predicted downward trend in population numbers or habitat suitability that would substantially reduce species distribution. Federal laws and direction applicable to sensitive species include the NFMA and FSM 2670. The Forest is required to determine the potential effect of proposed activities on SS and to prepare biological evaluations. The Forest Service is bound by federal statutes (ESA, NFMA), regulations, and agency policy (FSM 2670) to conserve biological diversity on NFS lands and assure sensitive species populations do not decline or trend toward listing under the ESA. This document fulfills the requirements of the biological evaluation for sensitive species. The Proposed Actions would not affect sensitive

species viability on federal lands, nor would it cause sensitive species to become federally listed as threatened or endangered.

Species Viability: The Proposed Action, in combination with and within the context of past, present, and reasonably foreseeable future management actions in the Analysis Area, would not affect population viability or distribution of native and desired nonnative vertebrate species on the Forest. The Draft Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005) contains information on species of concern or interest including range-wide and state-wide status and known population information. At the Forest-wide scale, this Project would not disturb, agitate or bother populations to a degree that causes, or is likely to cause, a measurable decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior.

3.7.3 Resource Indicators

The primary indicator for direct, indirect, and cumulative effects to wildlife species is the effect to their habitat, or disturbance associated with proposed activities. Existing habitat conditions were determined by field observations, vegetation data, habitat modeling, disturbance/management history, and sighting records. Analysis indicators for species analyzed in detail are displayed in Table 3-27.

Table 3-27. Wildlife analysis indicators used to compare alternatives in the Clear Creek Integrative Restoration Project Area

Species	Analysis Indicator
American, marten, Black-backed Woodpecker, Fisher, Flammulated Owl, Fringed Myotis, Long-eared Myotis, Long-legged Myotis, Mountain Quail, Pygmy Nuthatch, Northern Goshawk (nesting habitat), Pileated Woodpecker (nesting habitat), Ringneck Snake, Western Toad	Acres treated in modeled suitable habitat
Elk Winter Range (MA 16)	Acres treated in Forest Plan MA 16
Elk Summer Range	Elk Habitat Effectiveness Areas meeting Forest Plan Standards using Leege (1984)
Elk/Wildlife Security	Number of Elk Analysis Areas meeting recommendations for elk security
Gray Wolf	Elk Habitat Effectiveness Areas meeting Forest Plan Standards Numberof Elk Analysis Areas meeting recommendations for elk security
Canada Lynx	Acres of denning habitat treated Acres of foraging habitat treated Consistency with Northern Rockies Lynx Management Decision
Moose Winter Range	Acres treated in Forest Plan MA 21

3.7.4 Analysis Methodology

The Nez Perce Forest Plan designated 11 management indicator species (MIS). The Forest Service Northern Region (R1) has identified 21 sensitive species (SS) that are suspected or known to be present on the Forest. The USFWS recognizes the Forest as secondary area, unoccupied habitat for threatened Canada lynx. Additional information for these species can be found in the Project file.

The wildlife analysis identifies wildlife species and/or their habitat potentially present in the Analysis Area. Species include ESA listed, sensitive and MIS. The analysis presents the distribution, population status, and habitat ecology of each species and their existing habitat conditions. Modeling of potential habitat in the Analysis Area was conducted using GIS and was based on vegetative characteristics preferred by each species.

Table 3-28 displays the habitat criteria used to identify suitable habitat for each species. Suitable habitat considered includes that necessary for breeding, nesting, rearing, and foraging activities. Suitability is based on stand characteristics such as tree species, tree size, and tree canopy cover. Other habitat quality considerations include patch size, snag numbers and size, downed wood, riparian habitat, and security areas. Stand criteria used to assess species' habitat suitability were obtained from peer-reviewed technical literature on species specific research.

Table 3-28. Habitat criteria used to identify suitable wildlife habitat in the Analysis Area.

Wildlife Species	Primary Tree Species[a]	Tree Diameter (inches dbh)	Tree Canopy Cover (%)	Age Class (years)	Suitable Habitat (Acres)
Canada Lynx	Denning Foraging	–	–	–	1,220 1,420
Pygmy Nuthatch	PP, DF	>9	<70	>80	960
Flammulated Owl	PP, DF	≥12	35-70	>80	779
Ringneck Snake	VRU 3	–	–	–	3,030
Fringed Myotis	PP, DF	≥12	<80	>100	192
Long-legged Myotis Long-eared Myotis	All Species	≥12	<80	>100	8,157
Mountain Quail	All Habitat s in VRU 3	–	–	–	187
Pileated Woodpecker Nesting	PP, WL, DF, WWP, GF, WRC	≥15	≥ 15	–	8,160
Black-backed Woodpecker	PP, DF, WL, LPP, S	≥10	≥40	>40	2,357
Northern Goshawk Nesting	PP, DF, WL, LPP, GF, WWP	≥13	≥35-70	>50	2,066
Western Toad Uplands	All species on southerly aspects	All	<30	–	510
American Marten	SAF, S, LLP, GF, WRC	–	>17	>100	17,328
Fisher Summer Winter	WRC, GF, DF, LPP, SAF, S	>13 Sapling/young	>40 >40	>100 -	10,037 13,570
Moose Winter (MA 21)	Mapped MA 21 Outside MA 21	–	–	–	2,700 8,156

[a]PP- ponderosa pine; DF- Douglas-fir; WL-Western larch; WWP-Western white pine; LPP- Lodgepole pine; GF- grand fir; WRC- Western redcedar; S- Englemann spruce; SAF- Subalpine fir

Habitat status and population viability at the Forest level is presented for some species based on Forest Service Northern Region analyses (Samson 2006; Bush and Lundberg 2008). This provides a broader scale context relative to the Analysis Area.

This analysis uses the best available science to assess effects. Data related to vegetative features to model potential habitat, including species, age, size, density, canopy cover, and harvest history were taken from the TSMRS, FSVEG, FACTS, 2011 VMap, and LIDAR databases. The database was recently updated with stand exams that were conducted in 2011 and 2012. ArcMap GIS was used for modeling, mapping, and quantifying habitats and Project impacts. Considerable information on wildlife habitat conditions was obtained from the following four supporting documents: "Clear Creek NFMA Assessment" (USDA Forest Service 2011); "Selway and Middle Fork Clearwater Rivers Subbasin Assessment" (USDA Forest Service 2001); "Proposed Land Management Plan Nez Perce National Forest" (USDA Forest Service 2007a), and; the "Nez Perce National Forest Land and Resource Management Plan" (USDA Forest Service 1987b). Field review of treatment areas was conducted in 2011 and 2012. Field visits combined with National Agricultural Imagery Program (NAIP) images were used to validate information gathered from other sources.

The Idaho State Conservation Data Center (CDC) is the primary storehouse of sensitive or rare wildlife species survey and observation data. CDC data was mapped within a 5-mile radius of the Project area boundary to identify sensitive species potentially using the Project area. Old-growth habitat was identified using NRIS R1 Old-Growth Report Query based on 2011 and 2012 stand exams and field review during the same time period. The Idaho State Wildlife Comprehensive Wildlife Conservation Strategy provides background habitat and population information and is incorporated by reference (IDFG 2005).

Information for bird species has been synthesized from the Northern Region Land Bird Monitoring Program with data available from the avian science center[3], as well as The North American Breeding Bird Survey[4] (Sauer et al. 2011).

Population trend information for elk and moose was synthesized from data available from the Idaho Department of Fish and Game research reports[5].

This analysis incorporates the effects on terrestrial sensitive species and fulfills the requirements of the required Biological Evaluation, per direction pertaining to the FSM and streamlining process (USDA Forest Service 1995). The streamlined process for doing biological evaluations for sensitive species focuses on the following two areas:

- Incorporating the Effects on Sensitive Species into the NEPA Document
- Summarizing the Conclusions of Effects of the Biological Evaluations for Sensitive Species

[3] http://avianscience.dbs.umt.edu/

[4] http://www.mbr-pwrc.usgs.gov/bbs/bbs.html

[5] http://fishandgame.idaho.gov/

The following Regional Forester sensitive species may occur in the Project area: black-backed woodpecker, fisher, flammulated owl, fringed myotis (bat), gray wolf, long eared myotis, long-legged myotis, mountain quail, pygmy nuthatch, ringneck snake, and western toad.

3.7.4.1 Species Dropped from Detailed Analysis

The following Sensitive species or MIS species were dropped from detailed analysis as suitable habitat is not present, or the project would not affect individuals or their habitats: American peregrine falcon, bald eagle, bighorn sheep, black swift, Coeur d' Alene salamander, common loon, harlequin duck, long-billed curlew, Townsend's big-eared bat, white-headed woodpecker, wolverine, northern Idaho ground squirrel, yellow-billed cuckoo, and grizzly bear. Detailed information on why these species were dropped can be found in the wildlife technical report in the project record.

3.7.4.2 Species Analyzed in Detail

The area used for species analysis is primarily the 43,700 acres Project area scale. This scale is small enough to detect potential changes in habitat but not too large for them to be diluted beyond measure. There are several species where specifically identified analysis units are required to be used for the analysis. They include: Old Growth Analysis Areas (OGAAs), Lynx Analysis Units (LAUs), and EAAs.

Fire suppression is the only future foreseeable management action that would occur in the project area and could affect species habitats. It is the only foreseeable action considered in the cumulative effects analysis for all species. All past activities are considered as part of the existing condition and there are no present activities that would affect the analyzed species. Private lands were not considered for most species because there is not enough detailed information on forest stand size, age, canopy cover, and species composition to determine whether or not suitable habitats are present for each species.

3.7.5 Environmental Consequences

3.7.5.1 Fringed, Long-eared, and Long-legged Myotis

The fringed, long-eared, and long-legged myotis are Region 1 Sensitive species. Habitat for the fringed, long-eared, and long-legged myotis occurs in the project area. The fringed myotis is also considered a species of greatest conservation need in Idaho (IDFG 2005).

All three species are known to be multiple habitat bats in regard to roosts, hibernacula and foraging habitats. They utilize caves, mines, buildings, cliff faces, bridges, exfoliating tree bark, snags, and crevices in rocks as roost and hibernacula sites. Large trees with protective bark and large snags provide the primary roosting habitat in the Analysis Area.

The long-legged myotis generally occurs in forested montane regions (Harvey et al. 1999). Habitat is often relatively continuous tracts of late-successional forest. They forage throughout most of the night in and above the forest canopy (Harvey et al. 1999, Warner and Czaplewski 1984). In managed forests, the long-legged myotis avoided harvest units unless large snags and old trees were left in relatively high densities, such as in shelter woods and aggregate retention patches (Taylor 1999). These bats have been found in north central Idaho using managed forests with trees that range from 5 to 15 inches in diameter.

The long-eared myotis often occurs in rocky areas in an extensive variety of habitats (Adams 2003). Individuals typically roost under bark, in tree cavities, in crevices in cliffs, or in abandoned buildings (Romin and Bosworth 2010, Harvey et al. 1999, Nagorsen and Brigham 1993). The species has been found roosting in the snags and stumps of Douglas-fir, western hemlock (Barclay and Kurta 2007), western red cedar (Arnett and Hayes 2009), and pine (Vonhof and Barclay 1997). There are 8,157 acres of suitable habitat for long-legged and long-eared bats.

The fringed myotis inhabits a variety of habitats, including sagebrush steppe, grassland, and montane forests (Adams 2003, O'Farrell and Studier 1980), primarily at middle elevations of 3,900 to 7,050 feet. It is often found in dry habitats where open areas are interspersed with mature forests, creating complex mosaics with ample edges and abundant snags (Keinath 2004). There are 192 acres of suitable habitat for fringed myotis.

The reduction in the amount of large diameter trees and snags in previously harvested areas and the transition of older forests dominated by large shade-intolerant tree species toward a dense structure of smaller diameter, shade-tolerant tree species, primarily due to fire exclusion (Wisdom et al. 2000) has subsequently reduced bat roosting habitats. The change in species composition resulting from fire exclusion has slowly replaced such species as ponderosa pine, white pine and western larch, with stands trending toward smaller and younger size and age classes that are more susceptible to insects and disease before reaching maturity. These conditions have limited suitable habitat for fringed myotis in the project area.

Two long-legged and 2 long-eared myotis were captured in the Analysis Area in 2006. Both locations occurred in grand fir forest older than 130 years. The fringed myotis has not been observed in the Project area but they were netted during a bat survey at Moose Creek Ranger Station in 1998. The Station is within 5 miles of the project area and it is assumed that this species could occur in the project area.

Population Trends: Long-legged and long-eared myotis have a global rank of G5 (secure) and an Idaho State rank of S3 (vulnerable). The long-eared myotis is a bat of western North America and one of the most widely reported bats in northern Idaho (Romin and Bosworth 2010).

The fringed myotis has a global rank of G4/G5 (apparently secure/widespread, abundant, and secure) and an Idaho State rank of S2 (imperiled). The Western Bat Working Group (1998) ranked long-eared myotis and long-legged myotis as moderate conservation concern. The present population status of fringed myotis is unknown. The Western Bat Working Group concluded that it may be uncommon or rare through most of its western range. It was one of the least common detected species during surveys in northern Idaho (Romin and Bosworth 2010).

3.7.5.1.1 Direct, Indirect, and Cumulative Effects

Alternative A—No Action

No timber harvest, temporary road construction, or prescribed burning would occur under Alternative A. Fire exclusion allows forests to become denser, preventing sunlight from entering potential roost sites. This alters the microclimate of roosts and limits easy access to the sites (Knight 1994; Mannan et al. 1996; Vonhof and Barclay 1997). Fire suppression

would continue under this alternative and habitats would become denser, creating conditions that would promote stand-replacing fire. Wildfires can change vegetative structure and composition, altering roost habitat by removing loose, exfoliating bark and opening tree canopy. However, fires assist in snag recruitment, thus potentially providing more roost sites. This alternative could have both positive and negative impacts on long-legged, long-eared and fringed myotis.

Alternatives B, C, and D—Action Alternatives

For Alternatives B, C, and D, the determination for fringed, long-eared, and long-legged myotis is *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide".* Forest management activities can have direct (i.e., fatality) and indirect (e.g., loss of habitat and/or changes in prey availability) impacts on bats. Roost abandonment or death can occur in the winter if bats are disturbed (Adam 2003).

Alternative B and C would treat 593 acres (7%), and Alternative D would treat 406 acres (5%), of *long-eared and long-legged myotis* habitat through regeneration and improvement harvest. Six acres would be commercially thinned under all Alternatives. Under all Action Alternatives, landscape burning would occur on 75 acres (1%) of long-eared and long-legged myotis habitat.

Alternative B and C would treat 93 acres, and Alternative D would treat 72 acres of suitable *fringed myotis* habitat using regeneration harvest. Under all Action Alternatives, landscape burning would occur on 53 acres of fringed myotis habitat

Large tree and snag, old-growth habitat, and riparian habitat retention, would ensure that adequate snag habitat is available for myotis species through time. Timber harvest would remove roosting habitat; however retained live, dead, and legacy trees within treatment units would provide for some roosting and foraging and would provide future habitat structure through time. Regeneration harvest would also enhance herbaceous growth important for insect production and bat foraging. Long-legged myotis would likely use treated areas due to tree retention within the units. Treatments in fringed myotis habitat would create open areas but would remain adjacent to mature stands that contain snags preferred for roosting. Commercial and precommercial thinning would promote large tree growth for future roosting sites but would remove little habitat (thinned trees are generally too small in diameter for use). Design features include the retention of an average of 14–28 tpa in regeneration units, 80–100 tpa in improvement units, and 120 tpa in commercial thinning areas. Prescribed burning would be both positive and negative. It would create new snags but may reduce habitat availability by removing bark on trees or causing snags to fall. Burning would create more open areas preferred by fringed myotis resulting in slightly increased suitable habitat.

3.7.5.1.2 Cumulative Effects

Alternative A—No Action

There would be no cumulative effects to myotis species since cumulative effects can only arise from proposed actions when combined with past, present, and future foreseeable actions. There are no proposed actions associated with this alternative.

Alternatives B, C, and D—Action Alternatives

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 100 years because it would take this long to develop large snags in regeneration harvest and burning areas. Past actions have been accounted for in the existing condition. There are no present actions that would affect snags and bat roosting habitat. Fire suppression is the only future foreseeable management action that could affect snag and old growth habitats.

Wildfires may be allowed to burn in the Clear Creek Roadless Area; however there is no way to determine the extent of fires that may occur. Fire suppression would continue outside the Roadless Area where snags would be created primarily through insect and disease outbreaks. These would be available for use by bats. The direct and indirect effects of the action alternatives are expected to maintain suitable bat habitat both within and outside of treatment areas. Old growth and PACFISH buffers would provide habitat during the cumulative effects time frame. Fire suppression and allowing fire to burn in the Roadless Area would also provide habitat for bats. No cumulative effects are therefore expected from the Action Alternatives when combined with fire suppression.

3.7.5.2 Black-backed Woodpecker

The black-backed woodpecker is a Region 1 sensitive species. It is found in post-fire areas and in areas of insect outbreaks. They occur at highest densities in 1–6 year-old burns where there are abundant snags for nesting and beetles and wood-boring insects for feeding (Hutto 1995a, 1995b; Saab et al. 2004). Old forests allow populations to persist between fires in regions with long fire intervals. Black-backed woodpecker presence was primarily influenced by the occurrence of high severity burn patches (Hutto 1995 a,b).

Nearly 180,000 acres burned on the Nez Perce Forest between 2006 and 2011. Over 155,000 acres burned in 2012. On average 20,000 acres burned per year for the last 20 years. Insect and disease activity has also been occurring since the 1980s. All of these areas provide habitat for black-backed woodpeckers.

One fire burned 36 acres within the project area in 2008. No other fires have occurred that would provide highly suitable habitat. Black-back woodpecker occupancy is expected to be low as a result. Endemic populations of black-backed woodpeckers are likely sustained by dying and recently dead standing trees from localized insect and pathogen activity (USDA Forest Service 2007d), such as the tussock moth outbreak that occurred in 2011 in the upper South Fork of Clear Creek. There is an estimated 2,357 acres of suitable habitat in the Analysis Area.

Population Trends: Idaho ranks this species as S3 (vulnerable). Breeding bird survey (BBS) data show a long-term upward trend of >0.25% per year since 1966 in north-central Idaho (Sauer et al. 2011). Idaho Partners in Flight estimates a population of 4000 birds in Idaho. The state-wide population objective is to increase bird numbers to 4400 (Rosenberg 2004).

Field surveys targeting pileated and American three-toed woodpeckers were conducted in 2012 in the Analysis Area. One of 12 sample units detected black-backed woodpeckers. These surveys did not target black-backed woodpeckers, so this is an underestimate of black-backed woodpecker presence in the Analysis Area.

No scientific evidence exists that the black-backed woodpecker is decreasing in numbers (Samson 2006) in the Northern Region. The study indicates 29,406 acres of suitable habitat are required to maintain a viable black-backed woodpecker population in Forest Service Region One. Bush and Lundberg (2008) show over 700,000 suitable acres on the Nez Perce Forest alone. As of September 22, 2012, the very active and prolonged fire season on the Nez Perce and Clearwater National Forests has created over 200,000 acres of burned habitat. There is adequate black- backed woodpecker habitat across the Forest.

3.7.5.2.1 Direct and Indirect Effects

Alternative A—No Action

None of the proposed activities would be implemented. Tree mortality is expected to continue in the upper South Fork tussock moth outbreak area. Root disease is also prevalent in the Analysis Area and would provide a continuous supply of snags. Fire suppression would continue allowing for an increase in fuel loading. This would make the area susceptible to a stand replacing fire event which would create highly suitable black-backed woodpecker habitat.

Alternatives B, C, and D—Action Alternatives

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the black-backed woodpecker. Alternatives B and C would treat 420 acre (18%), and Alternative D would treat 363 acres (15%) of black-backed suitable habitat through regeneration and improvement harvest. Regeneration harvest would remove snags where necessary for logging safety but would retain them where possible. Canopy cover would also be reduced. Regeneration harvest would reduce foraging opportunities for black backed woodpeckers. Improvement harvest would reduce canopy cover to 30%–40% which is at or just below preferred levels but would large trees and snags. Landscape burning would increase habitat on 229 acres (10%) of suitable habitat. Fire killed snags would provide foraging opportunities for up to 10 years. In general, project activities would reduce insect and disease mortality and reduce the risk of future stand-replacing forest fires on 28% to 25% of suitable habitat. This would reduce the potential quality and quantity of future habitat by reducing tree densities. Commercial and precommercial thinning would indirectly promote large tree growth for future roosting sites but would remove little habitat.

Project design features would retain live trees and snags in all harvest units that would provide limited foraging habitat. Use of the Project area by black-backed woodpeckers could continue as untreated area would continue to provide feeding and nesting habitat. Prescribed site preparation burning would cause some mortality in retained trees, also providing future feeding and nesting habitat. This effect would be greatest under Alternatives B and C because they have the greatest number of treatment acres.

3.7.5.2.2 Cumulative Effects

Alternative A—No Action

There would be no cumulative effects to black-backed woodpeckers since cumulative effects can only arise from proposed actions when combined with past, present, and future foreseeable actions. There are no proposed actions associated with this alternative.

Alternatives B, C, and D—Action Alternatives

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 150 years because it would take this long to develop habitats with high levels of snag habitat. Past actions have been accounted for in the existing condition. There are no present actions that would affect snag habitat. Fire suppression is the only future foreseeable management action that could affect snags.

Wildfires may be allowed to burn in the Clear Creek Roadless Area; however there is no way to determine the extent of fires that may occur. A burn would create highly suitable woodpecker habitat for up to a decade. Fire suppression would continue outside the Roadless Area where snags would be created primarily through insect and disease outbreaks. These would be available for use by woodpeckers. The direct and indirect effects of the action alternatives are expected to maintain suitable woodpecker habitat both within and outside of treatment areas. Fire suppression and allowing fire to burn in the Roadless Area combined with the retention of old growth and other retention areas would maintain habitat for black-backed woodpeckers. No cumulative effects are therefore expected from the Action Alternatives when combined with fire suppression.

3.7.5.3 Canada Lynx

The Canada lynx is a Threatened species. The NRLMD Record of Decision (ROD) amended 18 Forests Plans in Region 1. The direction of that decision applies to "mapped lynx habitat on NFS lands presently occupied by Canada Lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service and the USFWS. When National Forests are designing management actions in unoccupied mapped lynx habitat they should consider the lynx direction, especially the direction regarding linkage habitat." (USDA Forest Service 2007c, p. 1). The NRLMD, ROD selected Alternative F, Scenario 2, which states: management direction would be incorporated into all forest plans, but would only apply to occupied habitat. Under Scenario 2, the direction should be "considered" for unoccupied units, but would not have to be followed until such time as lynx occupy the unit. The Nez Perce was considered to be unoccupied based on the best scientific information available at that time of the NRLMD Forest Plan Amendment.

Currently, there are inconsistencies in the status of lynx on the Nez Perce National Forest. The Nez Perce Forest is labeled as unoccupied, yet there are historical and more recent anecdotal observations of lynx across the forest. However, these observations are not considered to be "verified" as defined by the NRLMD (USDA Forest Service 2007a, b; pg 3, pg 99-100, pg 142-143; USDI Fish and Wildlife Service 2006 pg 4), nor do anecdotal sightings determine that there is reproduction or a resident population. The accuracy of a few of the lynx sightings is reputable because lynx were caught in traps and then verified by the Idaho Department of Fish and Game. These trapped lynx were prior to 1999 and so any lynx

documentation prior to 1999 was not considered in designation of a unit being listed as occupied or unoccupied. The accuracy of other sightings many be low due to observer bias in confusing lynx and bobcats. Due to the infrequent nature of lynx observations on the Nez Perce National Forest, there is no evidence to show that there is a resident population or reproduction.

The Rocky Mountain Research Stations conducted surveys for lynx in 2007 for the Nez Perce National Forest. The surveys were conducted according to established protocols outlined in the NRLMD (Ulizio et al. 2007). The surveys conducted in 2008 (hair snare) and 2009 (winter track surveys) were reduced in size and scope due to snow conditions, limited personnel and limited funding. No lynx were detected during any of these survey efforts (2007, 2008, or 2009).

Due to inconsistencies on the status of lynx on the Nez Perce NF, the USFWS sent a letter addressed to the Forest Supervisor, Rick Brazell on December 10, 2012 stating that "there is consensus that transient lynx may be present on the Nez Perce National Forest, at least occasionally". The USFWS referenced two pieces of information to come to this conclusion: 1) Ulizio et al. (2007) that noted, "Historical sightings that may have been confirmed may be the result of transient lynx moving through the forest, but the infrequency of such reports suggests lynx are incidental to the area", and 2) McKelvey et al. (2000) reported "numerous verified historical records from Idaho County". The letter also stated that, "the issue of lynx occupancy on the Nez Perce National Forest is a separate but related matter that is not the focus of this letter". Follow-up discussions with USFWS occurred on December 17, 2012 with Nez Perce National Forest personnel to assist in clarifying the letter. The USFWS stated that a Biological Assessment (BA) should be prepared and informal consultation would need to be completed with USFWS if a determination of a "May Affect, but Not Likely to Adversely Affect" determination was reached for Nez Perce National Forest projects. USFWS also clarified that this does not change the Nez Perce National Forest status as 'unoccupied', but further lynx surveys are needed to determine occupancy and any analysis for a BA should be focused on analyzing the project and its impacts on transient (not resident or breeding) lynx.

The 2005 Canada Lynx Recovery Area map identified the Nez Perce Forest as secondary Canada lynx habitat[6]. In the 2009 mapping effort, the USFWS did not identify critical lynx habitat on the Forest[7] (74 FR 8616 8702). The modeled lynx habitat within the analysis would be considered secondary areas that may contribute to lynx persistence by providing habitat that allows dispersing lynx to travel between core areas. The USFWS concluded that Forest vegetation management in secondary areas would provide adequate connectivity and opportunistic foraging habitat for dispersing lynx in the absence of specific habitat management direction (USDI Fish and Wildlife Service 2007).

The direct and indirect effects area will be assess using modeled lynx habitat in the Analysis Area (3,300 acres). The cumulative effects are assessed across the LAU 3050305, which

[6] http://www.fws.gov/mountain-prairie/species/mammals/lynx/final%20lynx%20RecoveryOutline9-05.pdf

[7] http://www.fws.gov/mountain-prairie/species/mammals/lynx/criticalhabitat_files/AllUnitsMap.jpg

totals 24,057 acres. The entire LAU contains modeled lynx habitat that consists of winter foraging (35%), lynx denning (34%). Of those areas, 9% is currently unsuitable lynx habitat. About 31% of the LAU is not modeled as potential lynx habitat and is referred to as non-lynx habitat. Impacts across an entire LAU are assessed, because the LAU contains enough habitat to support the home range of a female lynx and is large enough to assess the effects of proposed activities but not too large as to make habitat changes undetectable.

Fourteen percent of LAU 3050305 lies within the Clear Creek analysis area. There are 3,300 acres of modeled lynx habitat within the analysis area. Of the 3,300 acres, 1,220 acres is winter foraging, 1,420 acres is denning, and 660 acres is non-lynx habitat. The denning and foraging habitat are dominated by grand fir and subalpine fir with a small component (10%) of lodgepole pine. The remainder of the Analysis area is too low in elevation and does not provide suitable habitats for lynx.

The NRLMD established standards and guidelines for the management of lynx. Standards are management requirements used to meet desired conditions. Standards were used in those situations where it was desirable to provide sideboards for project activities. To deviate from a standard, a plan amendment would need to be completed. Guidelines were used for those risk factors that may have possible adverse effects to individual lynx. The NRLMD states, "When National Forests are designating management actions in unoccupied mapped lynx habitat they should consider the lynx direction." The direction provided in the NRLMD is applied to lynx habitat at the LAU scale. In Table 3-29, the alternatives for the Clear Creek project are evaluated for consistency with the NRLMD Standards for Vegetation (VEG) Management activities and practices from the NRLMD ROD (USDA Forest Service 2007c).

Population Trends: Lynx populations occur at naturally low densities and very few museum or trapping records exist for Idaho County (McKelvey et al. 2000). No Canada lynx sighting records have been reported in the Project area (IDFG 2010). Two sightings have been recorded within 5 miles of the Analysis Area. The sightings are reasonably dated (1915 and 1992) and reported by people with unknown ability to correctly identify species (bobcat vs. lynx). Lynx surveys conducted on the Forest in 2007 found no evidence of lynx (Ulizio et al. 2007). At this time and based on new information presented by the USFWS (USFWS letter dated December 10, 2012), the Nez Perce National Forest will consider lynx to be occasionally present or transient. This does not suggest that lynx are breeding, denning, or rearing young on the Nez Perce National Forest, but that lynx may move through the Nez Perce National Forest during dispersal events. The Nez Perce National Forest is coordinating with the Rocky Mountain Research Station to conduct lynx surveys in the winter of 2013 following accepted NRLMD protocols to garner a better understanding of the status of lynx on the Nez Perce National Forest.

Table 3-29. Clear Creek Project consistency with the Northern Rockies Lynx Management Direction

Northern Rockies Lynx Management Direction	Is direction applicable to the Project and has it been met? Where direction is applicable but has not been met, explain the reason(s).
ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL): The following objectives, standards, and guidelines apply to management projects in lynx habitat in lynx analysis units (LAU) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use.	
Standard ALL S1 New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.	No new or expanded developments are proposed. Habitat connectivity would be maintained in untreated areas of the LAU. Vegetation treatments would occur on less than 0.5%of the LAU.
VEGETATION MANAGEMENT PROJETS (VEG): The following objectives, standards, and guidelines apply to vegetation management projects in lynx habitat in LAU. With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, and roads. None of the objectives, standards, or guidelines apply to linkage areas.	
Standard VEG S1 – Stand initiation structural stage limits Standard VEG S1 applies to all vegetation management projects that regenerate timber, except for fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6% (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10. The Standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages limit disturbance in each LAU as follows: If more than 30% of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.	No lynx habitat occurs in the WUI. At this time, only 9% of lynx habitat in the LAU 3050305 is currently unsuitable or in the stand initiation structural stage. The acres converted to a stand initiation structural stage for each of the alternatives include: 110 acres (0.5%) for Alternative B, 87 acres (0.4%) for Alternative C, and 58 acres (0.2%) for Alternative D. All activities are associated with regeneration harvest. No landscape burning occurs within the LAU. The project complies with Standard VEG S1 and is well below the 30% Threshold.
Standard VEG S2 – Limits on regeneration from timber mgmt. projects Standard VEG S2 applies to all vegetation management projects that regenerate timber, except for fuel treatment projects within the WUI as defined by HFRA The Standard: Timber management projects shall not regenerate more than 15% of lynx habitat on NFS lands in an LAU in a 10-year period.	No lynx habitat occurs in the WUI. At this time, only 9% of LAU 3050305 is currently unsuitable or in the stand initiation structural stage. The acres converted to a stand initiation structural stage for each of the alternatives using regeneration harvest include: 110 acres for Alternative B, 87 acres for Alternative C, and 58 acres for Alternative D. The project complies with Standard VEG S2 and is well below the 15% Threshold.

Northern Rockies Lynx Management Direction	Is direction applicable to the Project and has it been met? Where direction is applicable but has not been met, explain the reason(s).
Guideline VEG G11 – Denning habitat Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.	No treatments would occur in field verified lynx denning. Though treatments are proposed in 'modeled' lynx denning habitat, the habitat in treatment areas would be better described as lynx travel habitat. Vegetation treatments are not planned in the spruce-fir community or areas with an abundance of dead, down woody material. Treatments are proposed in dry community types made up of Douglas fir, ponderosa pine, grand fir, western larch, and western white pine. As a project design measure, harvest units will retain large down logs.
Standard VEG S5 – Precommercial thinning limits Standard VEG S5 applies to all precommercial thinning projects, except for fuel treatment projects that use precommercial thinning as a tool within the WUI as defined by HFRA, subject to the following limitation: The Standard: Precommercial thinning projects that reduce snowshoe hare habitat may only occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat	Does not apply to the Clear Creek project. No precommercial thinning would occur in lynx habitat.
Standard VEG S6 – Multi-storied stands & snowshoe hare horizontal cover Standard VEG S6 applies to all vegetation management projects, except for fuel treatment projects within the WUI as defined by HFRA, subject to the following limitation: The Standard: Vegetation management projects that reduce snowshoe hare habitat in multi-story, mature- or late-successional forests may occur only under certain conditions noted in the NRLMD.	There would be no harvest in mature- or late-successional, multi-story hare habitat. Though treatments are proposed in 'modeled' lynx winter foraging habitat. The habitat in treatment areas would be better described as lynx travel habitat. Vegetation treatments are not planned in the spruce-fir community or areas with dense horizontal cover. Treatments are proposed in dry community types made up of Douglas fir, ponderosa pine, grand fir, western larch, and western white pine.
Guideline VEG G1 – Lynx habitat improvement Vegetation management projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage stands for lynx or their prey (e.g., mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.	Regeneration harvest, prescribed burning (site prep), and planting in LAU 3050305 would recruit a high density of conifers near denning habitat. Tree retention would occur within all units to provide for future woody material. The acres converted to a stand initiation structural stage for each of the alternatives include: 110 acres (0.5%) for Alternative B, 87 acres (0.4%) for Alternative C, and 58 acres (0.2%) for Alternative D.
Guideline VEG G4 – Prescribed Fire Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.	Prescribed fire associated with site preparation would not create permanent travel routes. No firebreaks are proposed in lynx habitat.
Guideline VEG G5 – Habitat for alternate prey species Habitat for alternate prey species, primarily red squirrel, should be provided in each LAU.	Habitat for alternate prey would remain available in mature- and old-growth forest in the LAU.

Note: The only guidelines discussed are those that are affected by the project. Standards LAU S1 and Guidelines ALL G1, VEG G10 do not apply to the project and are discussed in the project record.

3.7.5.3.1 Direct and Indirect Effects

Alternative A—No Action

This alternative would have no direct or short-term indirect effects on Canada lynx because no treatments would be conducted. Red squirrel (an alternate forage species to snowshoe

hare) habitat would remain available on nearly 50% of mature and old forest in the Analysis Area and about 46% of the LAU. Over the long term (50–100 years), forest succession would continue in the analysis area, as modified by natural processes. Existing younger patches would continue to grow and mature. This succession would tend to reduce lynx foraging habitat, but would increase lynx denning habitat. If wildfires or extensive windstorms occur in the area, foraging habitat could be replenished, but these events may decrease denning habitat. Insect infestations and root disease would continue causing numerous dead trees to fall to the ground, which may provide high quality denning habitat if downed logs are densely layered. Because the events and processes that might affect forest succession (and therefore lynx habitat) in the analysis area are either unknown or highly variable in frequency and size, the long term indirect effect on lynx of Alternative 1 is not predictable.

Alternatives B, C, and D—Action Alternatives

All Action Alternatives are consistent with the NRLMD. The following analysis will evaluate the direct and indirect effects of the project on 'transient' or 'dispersing' lynx, or more specifically, lynx that may be incidental to the area or present during dispersal events. This analysis focuses on transient lynx since no lynx have been documented breeding on the Nez Perce National Forest. The areas that are not designated as 'core lynx areas' are considered 'peripheral areas', which are important in providing habitat to support lynx during dispersal movements or other periods, which then allow lynx to return to core areas (NRLMD, USFWS Biological Opinion, p. 59). These peripheral areas have secondary habitat and would include the Nez Perce National Forest. The lynx records in peripheral areas are sporadic and generally correspond to periods following cyclic population highs in Canada (NRMLD, USFWS Biological Opinion, p. 59). In the Biological Opinion, USFWS hypothesized that the peripheral areas may enable successful dispersal of lynx between populations or subpopulations, but the USFWS did not have enough information to clearly define the relative importance of secondary or peripheral areas and indicated that more research was necessary.

It is unlikely that the proposed project would have adverse impacts to transient lynx since the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) described resident lynx as being generally tolerant of humans and their management activities in forested landscapes. There is limited information on how a dispersing lynx reacts to changes in landscape connectivity, but some conclusions can be drawn. Ruggiero et al. (2000) reported "Lynx readily move across landscapes fragmented by conventional industrial forestry" and even further, "documented lynx movements have involved crossing open valley bottoms and large rivers", thus concluding that lynx can move long distances and are capable of these dispersal events. Although existing data was sparse, the data did not indicate that vegetation management or logging has impacted resident lynx or for that matter, transient lynx. It could be inferred that a threshold may be present for resident lynx. The thresholds established within the NRLMD for VEG S1 (30%) or VEG S2 (15%) were likely generated from this type of information. The Clear Creek alternatives maintain adequate habitat for a transient lynx and does not exceed the thresholds for VEG S1 or VEG S2, and would have minimal direct or indirect impacts on transient lynx.

In treatment units, habitat connectivity may be disrupted at a local level by regeneration harvest or commercial thin treatments, but overall landscape connectivity would continue to

allow lynx movements through this landscape in conjunction with riparian areas as well as in mature and old growth forests. Cumulatively, the proposed project would not regenerate more than 15% of lynx habitat in LAU 3050305 (Table 3-29). The majority of lynx winter foraging and denning habitat would be retained across the LAU. Even further, the treatments could create optimal conditions for lynx foraging and denning habitat considering that stands will be regenerated into younger stands adjacent to mature stands that may provide potential denning habitat. As recommended under Guideline VEG G1 (NRLMD, p. 4), "vegetation management should be planned to recruit a high density of conifers where such habitat is scarce….Winter snowshoe hare habitat should be near denning habitat". In addition, potential future denning substrate would be retained in newly created early successional stages through snag, green tree, and coarse woody debris retention guidelines.

The potential for a transient lynx to be present while implementation is occurring is extremely low. Project related (direct) impacts are considered negligible for transient lynx. Should a transient lynx be present in nearby areas when tree removal takes place, minor short-term disturbance impacts are possible. It could be perceived that lynx may be directly impacted by the noise and commotion created by heavy machinery, if present. Direct effects could be related to disturbance of individuals with lynx avoiding the area during implementation. If disturbance to individuals does occur, it would not significantly interrupt critical life history factors such as foraging for food, due to the difference in activity periods since lynx primarily forage at night or crepuscular periods. Further, given that project sites are localized areas that are mostly in timber management areas, minimal disturbance is anticipated. Overall, the short-term direct impacts are anticipated to be outweighed by the indirect, beneficial impacts to lynx by improving habitat quality over the mid- and long-term as discussed in the following section.

No precommercial thinning would occur in lynx habitat under any alternative and complies with NRLMD VEG S5 (Table 3-29). (Reference NRLMD, ROD, p.33)

Mature tree harvest and commercial thinning do not occur in multi-story stands and are consistent with NRLMD VEG S6 (Table 3-29). The higher elevations of LAU 3050305 have subalpine fir, grand fir and lodgepole pine; however there is minimal Engelmann spruce within the analysis area. The Engelmann spruce and subalpine fir community is important for lynx to meet its life history requirements (foraging and denning) as well as provide habitat structure for snowshoe hares that contribute to dense horizontal cover. As for the project area, it was stated in the vegetation section that the Subalpine setting comprises only 160 acres and has no treatments proposed. Alternatives B, C, and D propose to treat dry, lower elevation stands of grand fir and Douglas fir to promote early seral species such as ponderosa, western larch, and western white pine. The lower elevation, dry types are not considered important lynx habitat. Though treatments are proposed in modeled lynx winter foraging and denning habitat, the habitat types are relatively dry and would be better described as lynx travel habitat. The following description outlines which "modeled" habitats (winter foraging or denning) are being treated, but it should be noted that the models are not accurately predicting lynx habitat.

For Alternative B, proposed commercial thinning would occur in 55 acres (4%) of foraging habitat and 2 acres (0.2%) of denning habitat. Regeneration harvest for Alternative B would occur in 7 acres (0.5%) of foraging and 103 acres (8%) in denning habitat. Under Alternative C, proposed regeneration harvest would occur in 6 acres (0.4%) of foraging and 81 acres

(7%) of denning as well as commercial thinning in 55 acres (4%) in foraging and 2 acres of denning. Lastly, Alternative D proposes commercial thinning in 55 acres of foraging and 2 acres in denning as well as regeneration harvest in 2 acres of foraging and 56 acres (5%) of denning. The commercial thinning treatments would remove trees but would not reduce overstory cover significantly. Since the treatment areas would be better described as lynx travel habitat, no indirect effect to transient lynx habitat is anticipated.

The regeneration harvest treatments would remove most trees and convert the stands over to a stand initiation structural stage. The acres converted to a stand initiation structural stage for each of the alternatives include: 110 acres (0.5% of the LAU) for Alternative B, 87 acres (0.4%) for Alternative C, and 58 acres (0.2%) for Alternative D. Regeneration harvest would reduce canopy cover for a transient lynx over the short-term, but over the mid and long-term regeneration harvest would provide future hare foraging habitat in 20–30 years when trees become dense and tall enough to provide cover above the snow line. None of the alternatives would impede lynx travel, exploratory movements, or dispersal through this landscape because proposed treatments occur at a small scale (<0.5% of the LAU).

Though forest roads can change landscape connectivity for many wildlife species, preliminary information suggests lynx do not avoid roads (Ruggiero et al. 1994). After the Lynx Conservation Assessment and Strategy (LCAS) was published in 2005, the USFWS published a Clarification of Findings in the Federal Register commonly referred to as the Remand Notice, which stated, “We found no evidence that some activities such as forest roads, pose a threat to lynx” (USDA Forest Service 2007c, p.3). Lynx-vehicle collisions have been found on paved, high-speed highways with high volumes of traffic (e.g., reintroduced lynx in Colorado and Maine). Forest roads generally have low speeds and are gravel. The CFLRA does not allow the construction of permanent roads, thus, permanent road construction is not proposed for this Project. Any new temporary roads constructed will be recontoured after use, so a short-term loss of habitat connectivity can be anticipated, but will be restored after project is implemented.

A linkage area is defined in the NRLMD, Record of Decision as “providing connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys, or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks.” Linkages are ‘officially’ designated in collaboration with the Forest Service and USFWS to provide for connectivity across areas that are generally non-forested. The Clear Creek project area does not contain any official linkage areas.

3.7.5.3.2 Cumulative Effects

Alternative A—No Action

A total of 2,035 acres (9%) of lynx habitat in the LAU has been harvested or burned within the last 30 years. These areas are in the stand initiation or earlier structural stage and do not provide winter snowshoe hare habitat. Roughly 2% of these areas will become hare habitat within the next10 with the remainder to follow in up to 25 years. There would be no cumulative effect to hare or lynx habitat since there are no future foreseeable activities that would affect it.

Alternatives B, C, and D—Action Alternatives

For threatened species it is required under the ESA that cumulative effects are measured across state and private lands. There is no state or private lands that exist within LAU 3050305 and so no ESA cumulative effects are anticipated.

For NEPA, cumulative effects can only occur when added to past, present, and future foreseeable actions. Past and proposed actions are accounted for and discussed under the direct and indirect effects sections above. All past vegetation management projects have been incorporated into the baseline information for the lynx habitat models. Fire suppression is the only future foreseeable action in the LAU; however the effects cannot be determined since the amount of potential suppression is not known. There are no cumulative effects from the project since there are no other measurable foreseeable actions and the effects to lynx habitat from the proposed actions are small (0.2% - 0.5% of the LAU). Under all action alternatives, the NRLMD standards and guidelines would continue to be met in the LAU.

Existing Canada lynx habitat and snowshoe hare winter habitats are expected to remain available, well distributed and connected, within the LAU due to minimal proposed management. No measurable effects to lynx populations at the Forest or regional scale, or alteration of current population trend, are expected from any of the alternatives based on the widespread availability of suitable habitats across the Forest and region (USDA Forest Service 2007b).

The proposed federal action described for Alternatives B, C, and D will have *"no effect"* on the Canada lynx and/or its habitat. This determination is based on:

1. All objectives, standards and guidelines in the 2007 NRLMD would be met.
2. Negligible, short-term direct effects to transient lynx may occur related to disturbance (noise and mechanize equipment) during implementation of vegetation treatment. However, over the mid and long-term any short-term impacts would be offset by the positive benefits of regenerating snowshoe hare habitat for lynx foraging as described as a Guideline in VEG G1 (Table 3-29).
3. Travel habitat would be maintained across the LAU. Lynx, if present, are potentially transient animals traversing across the forest, thus no long-term impacts to individual lynx and their habitat are anticipated.
4. Forest roads generally have low speeds and are gravel, and do not pose a threat to lynx. No permanent road construction is proposed. Any new temporary roads constructed will be recontoured after use.
5. Lastly, the proposed Federal actions described under Alternative B, C, and D is not occurring within designated critical habitat, it would not result in the destruction or adverse modification of critical habitat.

3.7.5.4 Fisher

The fisher is a Region 1 sensitive species, a Forest MIS, and an Idaho species of greatest conservation need (IDFG 2005). There have been 11 fisher observations (2 observed tracks, the rest are individuals or trapping records) reported within five miles of the Analysis Area between 1982 and 2005. Two occurred within the Project area. The scattered distribution of these reports indicate well-distributed habitat.

Fishers are associated with mature coniferous forests and specific structural elements—particularly large trees and coarse woody debris (Ruggiero et al. 1994). They inhabit mesic, coniferous forest between 3,500–6,000 feet elevation, although habitat preference changes with season, age, and sex (Badry 2004; NatureServe 2012). Fishers avoid open ground (Buskirk and Powell 1994; Powell 1993) and have a preference for structurally complex areas with multiple canopy layers, including understory shrubs and large amounts of woody debris (USDA Forest Service 1998b, Marshall et al. 1996, Powell 1993). Ruggiero et al. (1994) concluded that riparian zones, high elevation old growth grand fir, and subalpine fir stands are important habitat components for fisher (Powell 1993). Fishers appear able to use "many different habitats for hunting as long as these areas provide overhead cover at either the stand or patch scales" (Weir and Harestead 2003: p. 9). Sufficient overhead cover in foraging habitat may be provided by either tree or shrub cover.

In a study on the Nez Perce National Forest in the Elk City area from 1985 to 88, most fisher observations were in mesic grand fir habitat types (Jones 1991). Grand fir and Engelmann spruce dominated stands the fishers used in summer. Similarly, in winter fishers used grand fir, Engelmann spruce, and lodgepole pine dominated stands. Summer habitat had a relatively high component of moderate to large diameter Engelmann spruce, large diameter Douglas-fir, and pacific yew. Fishers avoided stands with a strong lodgepole or ponderosa pine component. Winter habitat included stands with a relatively high basal area in Douglas-fir and lodgepole pine. Fishers also strongly selected wetland forest types, with selection for forested riparian habitats evident at several scales in summer and winter (Jones 1991). In summer, 50 percent and 75 percent of observations were within 49 and 75 feet of water. Moving across landscapes, fishers commonly used forested riparian areas, where preferred resting habitat and prey may be more available than in surrounding habitats.

In north-central, Idaho, home ranges contained 53 percent mature/old growth stands on average. In summer, 90 percent of observations were in mature/old growth forest. In winter, 54 percent were in mature/old growth and 46 percent in young forest (Jones and Garton 1994). Availability of large diameter logs (>21 inches dbh) appeared to be particularly important in winter habitat selection. Mature/old growth stands were used extensively for resting, while hunting occurred in a range of successional stages, including young sapling and pole forest. For resting, fishers preferred stands with canopy cover greater than 60 percent and for hunting they preferred canopy cover greater than 80 percent. They avoided areas with less than 40% canopy closure and drier habitats.

There are 10,037 acres (23%) of currently suitable summer habitat (mature/ old forest) and 13,570 acres (31%) of winter habitat (seedling/sapling/young forest) for fisher in the analysis area.

Population Trends: Fishers have a global ranking of G5 (secure) and a state rank of S1 (critically imperiled). Fishers are distributed throughout most of their historical territory in the Clearwater drainage, although the population remains at a low level (Buskirk and Ruggiero 1994). Samson (2006) indicates 100,078 acres are required to maintain a viable fisher population in Forest Service Region One. Bush and Lundberg (2008) show over 440,000 suitable acres of summer habitat and over 700,000 acres of winter habitat occur on the Nez Perce Forest.

3.7.5.4.1 Direct and Indirect Effects

Alternative A—No Action

This alternative would have no direct effects to mature or old growth habitat since no activities are proposed. Habitats would continue to be altered by natural events such as succession and insects/disease. Fire suppression would continue. Snag and large down wood habitat elements would remain available as trees die (and fall) from natural causes. A wildfire and/or insect and disease activity would leave greater numbers of snags and large down wood than exist now but would also reduce canopy cover. These more open areas would provide unsuitable conditions for fisher. Ongoing fire suppression may be beneficial for this species because it can help maintain mature and older habitats on the landscape longer. Winter habitat would continue to be available across the analysis area. Connectivity across the landscape would continue to be provided by RHCAs.

Alternatives B, C, and D—Action Alternatives

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the fisher as Sensitive species. As an MIS, *fisher populations would be expected to continue to display population stability across the Nez Perce National Forest* under Alternatives B, C, and D. Proposed regeneration harvest would simplify suitable fisher habitats in the short term (<50 years) by eliminating canopy cover and layering, reducing large down wood, and reducing standing snags in treated areas. Snags and down wood would be provided for over the long term through tree retention design features. Canopy cover would increase to suitable levels after about 30 years. Proposed commercial thinning would have minimal effects by retaining enough structure and overstory canopy to be used by fisher. The Action Alternatives would reduce the likelihood of a large, intense fire. Fires have both positive and negative effects on fisher (as discussed under the No Action alternative).

Jones (1991) suggests that landscape scale habitat management should incorporate young- to mid-successional stages to provide habitat for prey species while retaining mature and late-successional habitats that provide important denning and resting habitat. The project has been designed to maintain all successional stages within the Project area which would continue to provide suitable habitat for fisher.

Alternatives B and C would conduct regeneration and improvement harvest on 580 acres (6%) of currently suitable summer habitat and Alternative D regenerates 438 acres (4%). Landscape burning occurs on 22 acres (0.2%) and would have similar effects to regeneration and improvement harvest activities. Retained trees, snags, and down logs in these areas would provide future habitat for fisher as the stands age. All action alternatives commercially thin 35 acres (0.3%) of summer habitat. Commercial thinning would reduce canopy cover to 40%–60% and would maintain a canopy cover level suitable for fisher use.

Alternatives B and C conduct regeneration and improvement harvest on 1,124 acres (8%) and 1,646 acres (12%) of fisher winter habitat respectively. Alternative D does not conduct these types of harvest. No landscape burning is conducted on fisher winter habitat under any alternative. Alternative B, C, and D commercially thin 2,210 acres (16%), 1,731 acres (13%),

and 2,013 acres (15%), respectively. The effects of regeneration/improvement harvest and commercial thinning on winter habitat are the same as for summer habitat.

Habitat quality in currently suitable summer and winter fisher habitat would decrease in all Action Alternatives. Alternatives C would convert 18% of mature habitat to early seral conditions. Alternative B converts 16% and Alternative D coverts 4%. No harvest would occur in verified old-growth or RHCAs under any alternative. These areas would continue to provide suitable habitat and well as connectivity between suitable habitat patches on over 30% of the landscape. Insects and disease events would continue across the landscape causing tree mortality. These would produce snags and large down wood used by fishers for denning and resting. Commercial thinning would have minimal effects on up to 16% of fisher habitat. Summer and winter fisher habitats would remain well distributed and available under all alternatives. Trends in fisher populations at the local and forest scale would not be affected by project activities due to the wide availability of suitable habitats.

3.7.5.4.2 Cumulative Effects

The cumulative effects area for fisher is the 43,700-acre project area. The time frame for cumulative effects is 150 years which is the approximate amount of time required for stands to develop into a mature or older vegetative state and snags to develop into a condition that provides habitat for old growth and snag dependent species.

Alternative A—No Action

There would be no negative cumulative effects from this alternative since no actions would occur. The effects of fire suppression are the same as those discussed under the direct and indirect effects of the No Action alternative.

Alternatives B, C, and D—Action Alternatives

Past activities have been accounted for in the existing condition. Fire suppression could have positive effects on fisher habitat by limiting fire in mature and older forests. The cumulative risk to fisher habitat from the action alternatives is considered low due to the retention of old growth, PACFISH buffers, snag retention guidelines, and other mature stands that would provide fisher habitat after treatment. Young forest would continue to provide winter habitat for fisher. Woody debris would continue to accumulate and be created as trees age and die. At the Forest level and across the range of the species, the effects of past, present, and reasonably foreseeable future actions would be small to negligible.

3.7.5.5 Flammulated Owl

This species is a Region 1 sensitive species and an Idaho species of greatest conservation need (IDFG 2005). Idaho flammulated owl habitats are typically mid-elevation, mature or older open ponderosa pine and/or Douglas-fir forest (IDFG 2005). Groves et al (1997) showed flammulated owls used "…stands with mature to old ponderosa pine and Douglas-fir, multiple canopy layers, low tree densities, moderate to low canopy closure, and moderate ground cover". They prefer habitat on warm, south facing slopes. Clear Creek has limited habitat for these birds. There are 779 acres (2%) of suitable habitat in the Analysis Area. Habitat for flammulated owls is scattered and occurs in relatively small patches. The highest quality habitat occurs primarily on breaklands along lower Clear Creek.

Population Trend: In Idaho, the flammulated owl has a state rank of S4 (apparently secure). There is no population trend data for Idaho; however the Forest Service Region 1 conducted flammulated owl surveys across Montana and Idaho. Sixty-nine owls were detected on Nez Perce Forest. The 2005 effort included surveys in the nearby South Fork Clearwater River. Additional surveys were conducted in 2008 in Region One, including on the Forest. Flammulated owls were detected on 55% of the routes with the Nez Perce Forest having the highest proportion detections. A study conducted by Samson (2006) found no scientific evidence that the flammulated owl is decreasing in numbers in the Northern Region of the Forest Service (Samson 2006). There were 2 confirmed sightings 4 miles north of the Project area in 1995 (IDFG 2010).

Flammulated owl presence in the Project area has not been confirmed. Flammulated owls are difficult to detect because they are nocturnal and have low population densities.

3.7.5.5.1 Direct and Indirect Effects

Alternative A—No Action

No activities would occur under this alternative. Habitat would continue to be sparse, widely scattered, and in relatively small patches. Habitat quality and quantity would decrease as tree density in ponderosa pine and Douglas-fir habitats increase due to a lack of disturbance and fire suppression. Forest conditions would trend away from preferred open grown, old-growth habitats. The increase in tree density would also increase the risk of stand-replacing fire in potential habitats. This type of fire would lead to habitat loss. Nesting habitat would increase slowly as a result of insect and disease outbreaks where fire does not occur.

Alternatives B, C, and D—Action Alternatives

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the flammulated owl.

Proposed activities would have both positive and negative effects. Regeneration harvest would have the greatest potential to negatively affect flammulated owls. It occurs on 20%, 27%, and 21% of suitable owl habitat under Alternatives B, C, and D, respectively. Harvest would remove snags suitable for nesting and roosting. It would also reduce the number of canopy layers and ground cover which would improve foraging opportunities. Design features would retain 14–28 tpa and 15%–20% canopy cover in clumps and as scattered individual trees. All legacy trees would be retained. Retained trees would provide nesting and perching habitat after implementation and into the future as stands become denser and develop multi-layered canopies. Wright et al. (1997) found that flammulated owls were present in approximately half of the selectively logged stands in her study area south of Missoula, Montana. Howie and Ritcy (1987), in a British Columbia study, found that most owls occurred in mature and old stands of Douglas-fir with 35%–65% canopy closure that had been selectively logged 2 to 3 decades prior.

Improvement harvest would occur on 13% of potential owl habitat under Alternatives B and C. Roughly 4% would be treated under Alternative D. Proposed activities would improve habitat by making ponderosa pine stands more resilient to wildfire, reducing the Douglas-fir

and grand fir component, and retaining large ponderosa pine habitats in an open understory condition. Canopy would be reduced and would provide for foraging opportunities.

Commercial thinning would occur on 5%, 1%, and 4% of flammulated owl habitat under Alternatives B, C, and D, respectively. This activity would maintain suitable feeding, perching, and nesting habitat by retaining 120 tpa and retain 40–60% canopy cover. Precommercial thinning would occur on 3% of owl habitat under all alternatives. Both commercial and precommercial thinning would select for ponderosa pine and other resilient species preferred by owls. These activities would reduce tree density and promote the development of large trees and suitable owl habitat over the long term (>100 years).

Landscape burning would occur on 4% of owl habitat under all alternatives. It would increase snag habitat, decrease understory Douglas-fir and grand fir, and increase stand resiliency to wildfire. In higher severity areas, it may reduce habitat quality or quantity but the amount is not predictable.

The proposed activities would reduce nesting habitat through regeneration harvest but would retain or improve foraging habitat. Ponderosa pine cover types would increase on up to 7% of the breakland setting where regeneration harvest occurs. This would increase the amount of future habitat for flammulated owls. All treatments would increase the resilience of ponderosa pine and create the forest structure necessary to support the flammulated owl over time. The proposed activities are not likely to alter the population trend at the project or forest level due to the mostly positive effects associated with them. The negative effects are expected to be limited and there is no sign of decline at the regional level (Samson 2006). Owls would also continue to be able to use the treated areas primarily for foraging.

3.7.5.5.2 Cumulative Effects

The cumulative effects area for flammulated owl is the 43,700-acre project area. The time frame for cumulative effects is 100 years which is the time it takes to develop large snags and trees used for nesting.

Alternative A—No Action

The direct and indirect effects of this alternative when combined with fire suppression could lead to negative cumulative effects on flammulated owl in the event of a wildfire. Snags would be created but canopy cover would be reduced. Determining the extent and probability is not possible; however 50% of the Project area is currently susceptible to stand replacing fire.

Alternatives B, C, and D—Action Alternatives

There would be both positive and negative cumulative effects associated with the action alternatives. The project would reduce the amount of flammulated owl habitat by 21–27% through regeneration harvest in the short term (<100 years) but would create suitable habitat in all commercial, precommercial, and burned areas over the cumulative effects time frame. The potential for stand replacement fire is reduced by 7% across the Project area under all action alternatives. Fire suppression would maintain dense stands in untreated areas reducing the quality of owl habitat and increasing the risk of stand replacement fire in those areas. The level of cumulative effects cannot be assessed but are expected to be negligible.

3.7.5.6 Gray Wolf

Gray wolf is a Region 1 Sensitive species. Wolf habitat spans a broad range of elevations and habitat types. Key habitat components include: a sufficient year-round prey base of ungulates and alternate prey; suitable, somewhat secluded denning and rendezvous sites; and sufficient space with minimal exposure to humans (USDI Fish and Wildlife Service 1987).

The Pilot Rock wolf pack uses the Analysis Area. One rearing location was documented in 2007, and wolves with pups were observed in 2007, 2008, and 2010, where two rendezvous sites have been confirmed. No den sites were identified. Two wolves were captured in Hoodoo Creek in 2007 and wolf tracks were observed in 2011. The Analysis Area provides a variety of suitable habitats for wolves and their prey.

Ungulates comprise more than 90 percent of wolves' diets from spring through winter in the Rocky Mountains. Mule and white-tailed deer, elk, and moose are the principal prey species (USDI FWS 1987). Elk provide the primary prey base for wolves. Maintaining elk habitat effectiveness (EHE) above minimum Forest Plan standards, providing elk security areas above minimum recommendations and managing winter range to enhance elk forage productivity and quality would provide a sufficient prey base to sustain wolf populations according to State objectives for the Dworshak and Lolo Wolf Management Zones (WMZs).

Population Trends: The gray wolf recovery plan (USDI FWS 1987) established a recovery goal of 10 breeding pairs for three consecutive years in central Idaho. There are currently 101 wolf packs in Idaho as of 2011. Recovery objectives have been met and exceeded.

3.7.5.6.1 Direct and Indirect Effects

Alternative A—No Action

There would be no direct or indirect effects to denning or rendezvous sites. Habitat security would remain unchanged and high (see Elk section). Wolves would continue to have abundant prey sources. Insects and disease pockets would help maintain the prey species forage base of shrubs, forbs, and grasses. Fire suppression would continue which would increase the risk for wildfire. Large infestations or wildfire would reduce hiding cover for wolves and their prey, but would increase forage over a period of 20 years. Foraging habitat for elk would decline in these areas after 20 years as a result of forest succession.

Alternatives B, C, and D—Action Alternatives

The proposed activities would have no direct or indirect effects on known rendezvous sites since no activities are proposed in or near them.

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the gray wolf. All Action Alternatives would increase forage for elk. Harvesting and landscape burning would reduce tree canopy cover and promote the growth of native shrub species important for elk forage. The amount of forage from regeneration and improvement harvest would increase by 7%, 10%, and 5% under Alternatives B, C, and D, respectively. Forage improvements would last for about 30 years. Hiding cover would decrease by the same amounts in the treated areas and would be recovered in about 20 years. Landscape burning would occur on 3% of the Project area and

would promote forage growth on winter range in all Action Alternatives. Elk habitat effectiveness would decline from 0% to 8% under the Action Alternatives, but would remain above minimum Forest Plan objectives (see Elk section). There would be no change to elk security as a result of the action alternatives. Increases in elk forage, and therefore forage opportunities for wolves, are expected on 8% to 13% of the Project area. Reduced hiding cover would improve the potential hunting success for wolves in treatment areas.

3.7.5.6.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area and includes seven elk analysis units. The cumulative effects timeframe is 20 years because it would take this long for regeneration harvest and burned areas to develop into hiding cover. Cumulative effects were assessed using EHE because elk are the main prey base for wolves. Elk security was not addressed since there are no changes to it as a result of any of the alternatives.

Alternative A—No Action

The effects of this alternative are the same as those described under the direct and indirect effects. There would be no cumulative effects since there are no proposed actions with this alternative.

Alternatives B, C, and D

The cumulative effects of the action alternatives on EHE and wolves would be both positive and negative. Fire suppression would reduce forage quality and quantity by not allowing fires to burn; however proposed activities would increase forage by 8% to 13% depending on the alternative. The level of potential positive or negative cumulative effects cannot be determined as fire severity and size is not predictable.

3.7.5.7 Mountain Quail

This species is a Region 1 Sensitive species and an Idaho species of greatest conservation need (IDFG 2005). The species is on the fringe of its western range in Idaho and on the Forest (Idaho PIF 2000). Preferred habitat is dense thickets of rose, hawthorn, black currant, serviceberry, elderberry, blackberry, chokecherry and willow (Wisdom et al. 2000, Gutierrez and Delehanty 1999, Heekin and Reese 1994). They also use densely vegetated draws, shrubby understory and forest and meadow edges in open ponderosa pine and Douglas fir (Heekin and Vogel 1995). In Idaho, mountain quail habitat was dominated by tall shrubs that averaged 10 feet in height with an average canopy density of 45 percent that were within a few hundred feet of water. They occur most frequently in draws with shrub galleries along the breaks and secondary drainages of the Snake, Salmon, and Clearwater Rivers. Nests are primarily located within 200-300 yards of water since chicks require water soon after hatching (Johnsgard 1973; Wisdom et al. 2000). Known, recent locations on the Forest are in dry, low elevation, face drainages of the Salmon River. Mountain quail habitat is more commonly found on private lands at lower elevations in the Clear Creek watershed near Kooskia, Idaho (about 10 miles northwest of the Analysis Area) and along the lower Selway River canyon. Mountain quail historically occurred in the Project area.

Mountain quail breed and winter in warm and dry shrub-dominated communities (IDFG 2005). Healthy shrub-dominated riparian areas are important features of suitable habitat and provide corridors for quail to move to higher elevation breakland habitat in summer.

There are 187 acres of currently suitable early successional mountain quail habitat in the Project area. All if it is within VRU 3 in the Clear Creek Roadless Area and occurs along stream breaklands. VRU 3 contains 6% young seral conditions and is well below the desired condition of 15–25%. A small covey of mountain quail were observed 1 mile from the northeast boundary of the Project area in 1997 (IDFG 2010); however the observations were not confirmed.

Population Trend: Mountain quail populations have been declining in the intermountain west for the past several decades (Gutierrez and Delehanty 1999), and the Idaho population has experienced the same pattern of decline since the 1930s (Heekin and Reese 1994). Mountain quail occur along the Snake, Boise, Clearwater, Salmon, and Little Salmon River canyons (Heekin and Reese 1994). Remaining habitat areas are fragmented and populations often exist in isolated islands (Wisdom et al. 2000). Habitat in the Salmon River near Riggins, Idaho, supports a stronghold population.

3.7.5.7.1 Direct and Indirect Effects

Alternative A—No Action

Currently suitable habitat would become unsuitable over time as tree density and canopy cover increase and shrubs decrease. Habitats would be more susceptible to stand-replacing wildfire, which could directly harm birds but would create additional habitat for quail.

Alternatives B, C, and D

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the mountain quail. Proposed landscape burning would increase mountain quail habitat by 19% (35 acres). Burning would reduce the Douglas-fir and grand fir component in ponderosa pine stands, retaining large ponderosa pine and Douglas-fir trees, and promoting shrub growth. Landscape burning would help maintain open conditions; however birds may be disturbed by proposed activities. The risk is considered low given the small amount of proposed treatment acres and the expected low number of birds in the area.

3.7.5.7.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 20 years because this is when shrub habitat conditions would begin declining.

Alternative A—No Action

There could be minor cumulative effects from this alternative. No activities would be conducted to improve quail habitat and fire suppression would prevent the development of suitable habitat resulting from wildfire.

Alternatives B, C, and D

The Action Alternatives would improve habitat quality through the use of prescribed fire. Proposed treatments may increase the potential for allowing the future use of naturally ignited fire in the Roadless Area. This could be beneficial to quail. Fire suppression would

continue outside of the Roadless Area; however little habitat for quail exists outside of it. Minimal, but positive cumulative effects to mountain quail would be expected. There could be a positive trend in quail populations but it would be negligible due to the limited number of acres being treated.

3.7.5.8 Pygmy Nuthatch

This species is a Region 1 sensitive species and an Idaho species of greatest conservation need (IDFG 2005). In Idaho, the pygmy nuthatch has a state ranking of S1 (critically imperiled). They are residents in mountain conifer woodlands, often in open woodland with large trees (Baicich and Harrison 1997). In Idaho, they are mainly found in pine forests and woodlands, especially ponderosa pine. They prefer older, open ponderosa pine habitat with <70% canopy cover. Nests appeared most often in cavities excavated by other birds (McEllin 1979). Raphael and White (1984) and Brawn and Balda (1988) found 100% of nests were in snags, not live trees.

There are 960 acres of suitable habitat in the Analysis Area, most of which occurs on the breakland setting in VRU 3. Old forest preferred by nuthatches on this VRU is at 4% which is well below the desired condition of 20%-50%. Habitat is scattered in small patches generally under 15 acres in size. Home ranges of nuthatches are 4 to 10 acres. This species requires snags for nesting and forages on pine seeds and insects extracted from tree bark. Two pygmy nuthatches were recorded in the Analysis Area during a breeding bird point count survey in 1994.

Population Trend: Rosenberg (2004) and Partners In Flight (PIF) estimate approximately 5,000–5,300 individuals on a year-round basis in Idaho. BBS data indicate a positive population trend of >1.5% change per year from 1966–2010 for the northern and north-central Idaho pygmy nuthatch population.

3.7.5.8.1 Direct and Indirect Effects

Alternative A—No Action

Suitable habitat would be reduced in the Project area over time as tree density and canopy cover increases with forest succession. Ponderosa pine habitats would continue to be encroached on by shade tolerant Douglas-fir and grand fir further limiting suitable habitat. Fire suppression would limit the creation of new habitat. Snags would be retained across the landscape and would continue to develop as stands age which would provide nesting habitat for nuthatches. Existing young pine plantations would not provide suitable habitat for about 100 years.

Alternatives B, C, and D

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the pygmy nuthatch. Landscape burning on 280 acres (9%) of VRU 3 in currently unsuitable habitat would be beneficial to nuthatches. It would create suitable habitat by reducing Douglas-fir and grand fir, retaining large legacy trees, creating snags and maintaining ponderosa pine habitats in an open understory condition. Under all Action Alternatives, 87 acres (9%) of currently suitable habitat would be maintained with prescribed fire. Improvement harvest would open the

understory and enhance conditions on 37 acres (4%) of suitable habitat under Alternatives B and C, and 23 acres (2%) under Alternative D.

Commercial and precommercial thinning would reduce canopy cover and promote the development of large ponderosa pine over 100 years which would be beneficial to pygmy nuthatch. Commercial thinning would occur on 131 acres (14%) of suitable habitat under Alternatives B and D, while Alternative C thins 101 acres (11%). All Action Alternatives precommercially thin 46 acres (5%) of suitable habitat.

Regeneration harvest under the Action Alternatives would reduce nesting potential by 46 acres (5%), 77 acres (8%), and 19 acres (2%) under Alternatives B, C, and D respectively. Green tree and snag retention within treatment units would help retain some nesting and foraging habitat through the life of the stand. Ponderosa pine would be planted on breaklands which would increase its representation by 6%, 7% and 4% under Alternatives B, C, and D, respectively. This would create habitat over the long term and would benefit pygmy nuthatches. The project could have a positive trend on local pygmy nuthatch populations over time as it maintains 9% of the currently suitable habitat, increases habitat in the short term (10 years) by 13% and increases habitat in the long term (100 years) by up to 35%. The project partially reduces nesting habitat through regeneration harvest by 2% to 8%.

3.7.5.8.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 100 years because it would take this long to develop large snags and trees used for nesting after regeneration harvest.

Alternative A—No Action

The direct and indirect effects of this alternative when combined with fire suppression could lead to negative cumulative effects on pygmy nuthatch in the event of a wildfire when older forest are burned. Snags, however, would be created and would be available for future nesting. Determining the extent and probability of fire effects is not possible; however 50% of the Project area is currently susceptible to stand replacing fire.

Alternatives B, C, and D

There would be both positive and negative cumulative effects associated with the action alternatives. The project would reduce the amount of nuthatch habitat by 2% - 8% through regeneration harvest in the short term (<50 years) but would create suitable habitat in all commercial, precommercial, and burned areas over the cumulative effects time frame. The potential for stand replacement fire is reduced by 7% across the Project area under all action alternatives. Fire suppression would maintain dense stands in untreated areas reducing the quality of nuthatch habitat and increasing the risk of stand replacement fire in those areas. Fires would have short term negative but long term positive effects.

3.7.5.9 Ring-necked Snake

This species is a Region 1 sensitive species and an Idaho species of greatest conservation need (IDFG 2005). Ring-necked snakes can be found in forested, brushy areas or open hillsides that have rocks, logs, talus or other debris for cover and they may use microhabitats that are moist (Storm and Leonard 1995). In west-central Idaho they are typically found

adjacent to perennial rivers or streams in grassland or forested habitats (IDFG 2005). They are nocturnal and hide underground or under surface cover (wood, rocks) during the day making detections difficult. They feed on small invertebrates. An unrecorded observation of a ring-necked snake 5 miles north of the Project area was made in the 1990s. Similar elevations and drier vegetation types occur in the Analysis Area making it possible that these snakes are present in the area.

There are 3,030 acres of potential ring-neck habitat on the low elevation breaklands (VRU 3) where grasslands, open dry forest, and dry and moderately moist forest provide suitable conditions. Roughly 730 acres occurs within PACFISH RHCAs.

Population Trends: The ring-necked snake has a global rank of G5 (secure) and an Idaho State rank of S2 (imperiled). Current population and trend are unknown.

3.7.5.9.1 Direct and Indirect Effects

Alternative A—No Action

Fire suppression would continue under this alternative and habitats would become denser, creating conditions that would increase the risk of stand-replacing fire. Wildfires can directly harm ring-neck snakes and reduce their habitat. Long-term (>20 years) beneficial effects from fire include snag recruitment and subsequently large down wood recruitment which creates habitat for ring-necked snakes. Currently 50% of the Project area is susceptible to stand replacement fire.

Alternatives B, C, and D

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the ring-necked snake. Timber harvest and landscape burning activities can cause direct mortality through contact with fire, machinery, or yarded logs. The effects on direct mortality cannot be estimated, but given the lack of observations and the use of protected riparian areas as habitat, the risk is expected to be low. Riparian habitat used by snakes would not be affected due to PACFISH buffer implementation.

Regeneration harvest would treat 66 acres (2%), 177 acres (6%), and 27 acres (1%) of suitable habitat under Alternatives B, C, and D respectively. Commercial thinning would treat 236 acres (8%), 125 acres (4%), and 171 acres (6%) of suitable habitat respectively. Improvement harvest would treat less than 1% under all alternatives. Harvest activities would remove trees that would have eventually become downed wood and suitable habitat for snakes. Regeneration harvest would remove the most potential habitat compared to other treatments. Snags and standing live trees as well as downed wood would, however, be retained in all harvest units which would provide limited current and future habitat for snakes. Talus slopes and rock outcrops used by snakes would not be affected. Opening the tree canopy would stimulate shrub growth which could increase invertebrate production and therefore foraging opportunities for ring-necked snakes.

Landscape burning would treat 191 acres (6%) of suitable habitat under all alternatives. The effects to ring-necked snakes would vary depending on fire intensity. Low intensity areas are expected to have no effects while high severity areas could cause direct mortality to snakes.

Beneficial effects would be the increase in downed wood material (suitable habitat) 5 to 10 years after the burn when snags fall.

Grassland restoration activities occur on 0.1% of suitable habitat and would have no effect on this species. The overall negative effects to ring-necked snakes from proposed harvest and burning activities is expected to be low due to the retention of trees and downed wood in treatment areas and the retention of PACFISH buffers. No change to population trends of ring-neck snakes would therefore be expected from proposed activities.

3.7.5.9.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 20 years because this is the time when snags would to start falling in treated units creating habitat for ring-neck snakes.

Alternative A—No Action

There would be no direct effects to ring-necked snakes from this alternative. Indirect effects include increased stand densities resulting from fire suppression and an increased risk of stand replacing fire. This could result in direct mortality of snakes; however the risk is expected to be low as snakes can take cover under and may be protected by downed wood, rocks or talus slopes. Both positive and negative cumulative effects would be expected from this alternative as previously discussed. The levels are expected to be low due to the limited amount of potential habitat and effectiveness of fire suppression.

Alternatives B, C, and D

Cumulative effects to ring-neck snakes are expected to be both positive and negative and are the same effects as those discussed in the direct and indirect effects section. No quantitative estimate of cumulative effects can be provided since the number of potential fires and their size cannot be predicted. Harvest and landscape burn activities would reduce the risk of crown on 7% of the project area and 17% of VRU 3. Fire suppression would continue outside the Clear Creek Roadless Area (which is 28% of VRU 3). Naturally ignited fires in the Roadless Area may be allowed to burn after harvest and burn treatments are completed. This would allow for natural process to continue on 2,180 acres (72%) of VRU 3 which would be both beneficial and detrimental to ring-necked snakes depending on fire severity and size.

3.7.5.10 Western Toad

The western toad is a Forest sensitive species and an Idaho species of greatest conservation need (IDFG 2005). Western toads breed in temporary and permanent lakes, ponds, streams, and road ditches. They prefer shallow, warm areas with mud bottoms, and typically breed in May and June. Potential breeding and dispersal habitat occurs throughout the area along the network of riparian areas (10,700 acres, or 24% of the Analysis Area). Toads can be found from dry grasslands to moist subalpine forests, but optimal habitat is found in humid areas with moderate undergrowth (Nussbaum et al. 1983). They are largely terrestrial, but generally found within fair proximity to water. In Idaho, western toads are associated with almost all habitats within 1,600 feet of water.

Adult western toads are largely terrestrial and are very active at night. They have been known to move up to 1 mile from their breeding habitats, (Bartelt et al. 2004) often into upland

habitats (Bull 2006). Toads selected south-facing slopes, preferred open sites to forested settings, and sites with high density of burrows, rocks, logs, or rootwads that provided cover (Bull 2006). Burned and harvested sites were not avoided by western toads in Bull's study. Guscio et al. (2007) found western toad occurrence increased after wildfires and they used severely burned areas. Use shifted from severely burned to moderately burned areas in the late summer likely as a result of more ground/canopy cover and higher soil moistures. There are 510 acres of potential upland toad habitat (<30% canopy cover and south aspects) in the Project area.

Population Trends: This toad has a state rank of S4, apparently secure. Population trends in Idaho are difficult to track due to a lack of baseline information, but they are well distributed (Engle and Harris 2001). The western toad is known to occur on the Forest but none have been reported in the Analysis Area.

3.7.5.10.1 Direct and Indirect Effects

Alternative A—No Action

There would be no actions, and therefore no direct effects to western toad upland habitat under this alternative. There would be a reduction in the amount upland openings preferred by toads as forest stands age and become denser. Fire suppression would minimize the amount of new openings that could be potentially created by wildfire. Downed wood used for cover currently exists and recruitment would continue as a result of tree mortality caused by insects, diseases, and potential wildfire.

Alternatives B, C, and D

Western toad breeding habitats would be protected under all alternatives through no-harvest RHCA implementation. A minor amount of habitat could be lost through road decommissioning and road improvement activities. Permanent puddles occur along the edges of several roads as a result of poor road drainage. Long-toed salamanders were observed in 5 different roadside puddles (Smith, personal observation in 2010 and 2011). Tadpoles have been observed in similar pools but were not identified to species. Tadpoles are likely either western toads or Columbia spotted frogs. Road improvement or decommissioning would improve drainage and are proposed to limit the affect to area streams. The effects to toads from these activities are considered low due to a low numbers of sites where roadside puddles occur.

For Alternatives B, C, and D, the determination is a *"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide"* for the western toad. Alternatives B and C would improve upland habitat for toads on 55 acres (11%) and Alternative D would improve 59 acres (12%) of suitable habitat respectively through regeneration harvest. Commercial thinning would occur on 4 acres under Alternative B and D. Harvest activities would decrease canopy cover while retaining downed wood for cover. No landscape burning would occur in suitable toad habitat. Proposed activities have the potential to cause direct mortality to toads due to tree falling and yarding, site preparation burning, and road work. The risk is expected to be low due to design features that minimize yarding corridors in harvest units and road work being completed during the drier parts of the year. No change in the

population trend of toads is expected at the project level due to the limited amount of habitat being affected and the fact that treatments would slightly improve habitat quality for toads. All breeding habitat would be protected through the retention of RHCAs.

3.7.5.10.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area. The cumulative effects timeframe is 20 years because this is the time when tree canopy cover would begin to close and reduce the quality of upland toad habitat.

Alternative A

There effects to upland toad habitat are the same as the direct and indirect effects discussed above. This alternative would cumulatively reduce upland toad habitat because no landscape disturbance would occur which would maintain relatively closed canopies across the project area. Fire suppression would limit the number and size of fires that could create upland habitat for toads.

Alternatives B, C, and D

All action alternatives would maintain or increase the quality of upland habitat for toads. Treatments may allow for the use of naturally ignited fire in the Clear Creek Roadless Area which could create additional habitat. Fire suppression would occur outside of the Roadless Area limiting disturbance opportunities and toad habitat development there. The cumulative effects of the project would be beneficial (from harvest) to neutral depending on the amount of fire suppression activities. It is not possible to predict the amount of disturbance minimized by fire suppression.

3.7.5.11 American Marten

The pine marten is a Nez Perce Forest high elevation old growth MIS. Optimal habitat for marten has been described as mature/old-growth spruce-fir forest with at least 30% canopy cover, plentiful fallen logs and stumps, and a lush understory of shrubs and forbs. Marten in north-central Idaho were found to use a variety of forest types in winter, but activity was highest in Engelmann spruce/subalpine fir stands with mesic habitat types, >30% canopy cover, and overstory age >100 years (Koehler et al. 1975, Koehler and Hornocker 1977). Mature lodgepole pine is also suitable in moist habitat types, and in areas of high precipitation, dense cedar-grand fir forests at lower elevations provide habitat for the marten as well (Koehler et al 1975). There are 17,328 acres of suitable habitat for marten in the Project area. Marten habitat is well distributed and connected throughout the area in the mid- to upper elevations.

Population Trends: Total population size is unknown, but probably is at least several hundred thousand in the United States and the species can be regarded as secure (NaturServe 2012). Few data sets allow evaluation of population trends over long periods (Ruggiero et al. 1994). Samson (2006) indicates 17,297 suitable habitat acres are required to maintain a viable marten population in the Forest Service Northern Region. Bush and Lundberg (2008) show over one million suitable acres on the Forest.

3.7.5.11.1 Direct and Indirect Effects

Alternative A—No Action

This alternative would have no direct effects to mature or old growth habitat since no activities area proposed. Habitats would continue to be altered by natural events such as forest succession and insects/disease. Fire suppression would continue. Snag and large down wood habitat elements would remain available as trees die (and fall) from natural causes. A wildfire and/or insect and disease activity would leave greater numbers of snags and large down wood than exist now but would also reduce canopy cover. These more open areas would provide unsuitable conditions for marten. Ongoing fire suppression may be beneficial for this species because it can help maintain mature and older habitats on the landscape longer. Alternatives B, C, and D

Alternatives B, C, and D—Action Alternatives

Under Alternative B, C, and D, *marten populations would be expected to continue to display population stability across the Nez Perce National Forest.* Proposed regeneration harvest would simplify suitable marten habitats in the short term (<50 years) by eliminating canopy cover and layering, reducing large down wood, and reducing standing snags in treated areas. Snags and down wood would be provided for over the long term through tree retention design features. Canopy cover would increase to suitable levels after about 50 years. Proposed commercial thinning would have minimal effects by retaining enough structure and overstory canopy to be used by marten. The Action Alternatives would reduce the likelihood of a large, intense fire. Fires have both positive and negative effects on marten (as discussed under the No Action alternative).

Jones (1991) suggests that landscape scale habitat management should incorporate young- to mid-successional stages to provide habitat for prey species while retaining mature and late-successional habitats that provide important denning and resting habitat. The project has been designed to maintain all successional stages within the Project area which would continue to provide suitable habitat for marten.

Alternatives B and C would conduct regeneration and improvement harvest on 1,189 acres (7%) of currently suitable habitat and Alternative D regenerates 796 acres (4%). Retained trees, snags, and down logs in these areas would provide future habitat for marten as the stands age. All action alternatives commercially thin 40 acres (0.2%) of marten habitat. Commercial thinning would reduce canopy cover to 40%–60% and would maintain a canopy cover level suitable for marten use. No landscape burning occurs in marten habitat.

No harvest would occur in verified old-growth or RHCAs under any alternative. These areas would continue to provide suitable habitat and well as connectivity across over 30% of the landscape. Insects and disease events would continue across the landscape causing tree mortality. These would produce snags and large down wood used by martens for denning and resting. Marten habitat would remain well distributed and available under all alternatives. Trends in marten populations at the local and forest scale would not be affected by project activities due to the wide availability of untreated suitable habitats at the project and Forest level.

3.7.5.11.2 Cumulative Effects

The cumulative effects area for marten is the 43,700-acre project area. The time frame for cumulative effects is 150 years which is the approximate amount of time required for stands to develop into a mature or older vegetative state and snags to develop into a condition that provides habitat for old growth and snag dependent species.

Alternative A—No Action

There would be no negative cumulative effects from this alternative since no actions would occur. The effects of fire suppression are the same as those discussed under the direct and indirect effects of the No Action alternative.

Alternatives B, C, and D—Action Alternatives

Past activities have been accounted for in the existing condition. Fire suppression could have positive effects on marten habitat by limiting fire in mature and older forests. The cumulative risk to marten habitat from the action alternatives is considered low due to the retention of old growth, PACFISH buffers, snag retention guidelines, and other mature stands that would provide marten habitat after treatment. Woody debris would continue to accumulate and be created as trees age and die.

3.7.5.12 Northern Goshawk

The northern goshawk was identified as a Forest MIS for old-growth forest. Nesting habitat was chosen as the indicator because it is the primary limiting factor for goshawks and is represented by a much narrower range of vegetation structure and composition than the post-fledgling areas and forage area. Foraging habitat for goshawks may occur along the edges of open areas and is not considered limiting.

Goshawks use large landscapes, integrating a diversity of vegetation types over several spatial scales to meet their life-cycle needs (Squires and Kennedy 2006). In "The Northern Goshawk Status Review," the USFWS found that the goshawk typically uses mature forest or larger trees for nesting habitat; however, it is considered a forest habitat generalist at larger spatial scales (USDI Fish and Wildlife Service 1998). The USFWS found no evidence that the goshawk is dependent on large, unbroken tracts of old-growth or mature forest (63 FR 35183 June 29, 1998).

Nest areas are usually mature forest with large trees, relatively closed canopies (50%–90%) and open understories (Squires and Kennedy 2006). In central Idaho, goshawks nest in a variety of forest stands that are comprised of mature trees with relatively high canopy cover and open understories (Moser 2007). Nest trees typically range between 12" and 21" dbh and are located on relatively gentle terrain with 70% of nests occurring on shaded aspects. Favored habitats typically are located in forest stands having only 1 or 2 canopy levels with an open or mixed-density understory.

The goshawk is a habitat generalist at the foraging area scale. Goshawk foraging areas are heterogeneous and may include some mature forest components (Squires and Kennedy 2006) as well as a mix of other forest and nonforest components (i.e. sagebrush, grasslands, lowland riparian, and agriculture) (Younk and Bechard 1994, Reynolds 1994, Patla et al. 1997). Goshawks require habitats for prey that contain snags, downed logs, woody debris,

large trees, herbaceous and shrubby understories, and a mixture of stand structural stages (Wisdom et al. 2000). They are an opportunistic predator that take prey items on the ground, on vegetation, in the air, and rely on a variety of forested and non-forested habitats.

There are 2,066 acres (5%) of currently suitable nesting habitat in the Analysis Area. Goshawks have been recorded across the Forest and one was observed foraging near the Project boundary during recent field reviews.

Population Trends: The goshawk is rated secure across its range (global rank G5) and is apparently secure (state rank S4) in the state of Idaho (Digital Atlas of Idaho 2010). The goshawk population in the northern Idaho portion of the Northern Rockies Bird Conservation Region (BCR) is estimated to be approximately 3,900 birds (Rosenberg 2004). State-wide, the goshawk estimated population is 5,600, with a population objective of 6,200 individuals as noted by Rosenberg (2004). Survey data indicates an overall declining population Idaho since 1966; however it remains relatively stable in the Northern Rockies BCR (Sauer et al. 2011).

No evidence exists that the northern goshawk is declining in number in the western United States (Kennedy 1997, USFWS 1998, Kennedy 2003, Anderson et al 2005, Squires and Kennedy 2006). Samson (2005) also concluded no scientific evidence exists that the northern goshawk is decreasing in number in the Forest Service Northern Region. Samson (2006) concluded that 30,147 acres of post-fledging habitat was needed across Region One to maintain a minimum viable population of the northern goshawk. Bush and Lundgren (2008) found over 275,000 acres of post-fledgling habitat on the Forest, more than nine times the area needed to maintain viable populations region-wide.

3.7.5.12.1 Direct and Indirect Effects

Alternative A—No Action

No management actions would take place. Habitats would continue to be altered by natural events such as succession, insect and disease, and potential wildfire. A wildfire and/or insect and disease activity would likely leave behind greater numbers of snags than exist now but would also reduce canopy cover that may create unsuitable conditions for goshawk nesting.

In general, nesting habitat would increase and foraging habitat would decrease as forest succession continues to fill in understories and increase stand canopy closure. Fuel build-up resulting from fire suppression activities would continue, thereby increasing the likelihood of a stand-replacing fire. Stand-replacing fires would reduce nesting habitat in the short term (<50 years) but would create it and other various elements of goshawk habitat in the long term (>50 years).

Alternatives B, C, and D

Under Alternative B, C, and D, Northern goshawk populations would be expected to continue to display population stability across the Nez Perce National Forest. All action alternatives would harvest in suitable goshawk nesting habitat. Alternatives B and C would regeneration harvest 93 acres (5%), and Alternative D would harvest 85 acres (4%). Activities would reduce habitat quality by eliminating canopy cover and layering, and reducing some standing snags. Landscape burning on 45 acres (2%) of nesting habitat would have similar effects except that snags would be retained and additional ones created. Harvest

and burning activities would preclude treated areas from being used by nesting goshawks until canopy cover increases to suitable levels (generally >50 years). Implementation of snag and green tree retention guidelines in harvest units, as well as PACFISH buffers, would retain trees for future nesting and help limit effects of habitat simplification.

Commercial thinning would remove suppressed trees leaving 40%–60% of the tree canopy and about 120 tpa. All alternatives would thin 160 acres (8%) of suitable goshawk nesting habitat. Treatments may not retain enough overstory canopy to be used by nesting goshawks, but would promote large tree growth and would provide for foraging opportunities. Thinned areas would become suitable habitat as canopy cover increases over time (>20 years).

During Project implementation, human activity, equipment noise, and burning might preclude use of the area by goshawks. Any active nests found in a treatment unit would be reported to the Zone or Forest a wildlife biologist and activities halted while site specific conservation measures are developed. This would reduce the likelihood of disturbance or injury to individual birds.

None of the Action Alternatives would harvest in the 4,654 acres of MA 20 or the 10,700 acres of RHCAs. This equates to 35% of the analysis area. Mature and old forest habitat would therefore be maintained across the Project area and would be available for goshawk use. The Project is not expected to negatively affect goshawk population trends in the project area or at the Forest level due to the availability of untreated habitat in at both of these scales. Regional estimates indicate sufficient habitat is available to maintain population viability (Samson 2006; Bush and Lundgren 2008).

3.7.5.12.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area, which includes seven OGAAs. The cumulative effects timeframe is 150 years because it would take this long for regeneration harvest areas to develop old growth habitat characteristics. OGAA's were also selected because goshawks are an old growth MIS.

Alternative A—No Action

The potential cumulative effects of this alternative are the same as those described under the direct and indirect effects of the No Action alternative. There is a potential for cumulative effects; however levels cannot be determined because estimating the size and severity of potential future fires resulting from fire suppression is not possible.

Alternatives B, C, and D

Harvest and burning activities open and remove tree canopy, creating edges and clearings which would increase the amount of grasses, forbs, shrubs, and tree seedlings and improve habitat conditions for some goshawk prey species. Fire suppression would maintain closed canopies in untreated areas potentially improving nesting habitat over time. Suppression also increases the risk of stand replacing fire which could remove nesting habitat. Proposed treatments reduce the crown fire (stand replacement) potential by 7% across the project area.

The OGAAs would retain 6% to 21% verified old growth (see Old Growth section) which would provide nesting habitat for goshawk over time. Additional old growth would be maintained in RHCAs. Negative cumulative effects are not expected due to the availability of

untreated habitats and the likelihood that a wildfire would not burn all available nesting habitats during a fire event. There may be slight positive cumulative effects associated with creating openings for prey species.

3.7.5.13 Pileated Woodpecker

The pileated woodpecker was identified as a Forest MIS for old-growth forest and large snag habitat. The pileated is most often associated with mature forests (Samson 2006) although the presence of large trees for nesting is reported to be more important than forest age (). Pileated woodpeckers are relatively common in both cut and uncut mid-elevation forests, and appear to do well in a matrix of forest types (Hutto 1995a). They nest in both previously harvested stands that contain remnant large trees and snags, and in mature and old growth forests. The pileated woodpecker is able to do well in young and fragmented forests that retain abundant remnant structure, such as large diameter snags and down woody debris (Mellen et al. 1992).

Pileated woodpecker surveys were conducted in 2012 in the Analysis Area and within a mile outside of its boundary. Eleven pileated detections were made, 8 within the area and 3 in the one mile buffer. Nineteen additional observations were recorded throughout the Analysis Area during project review in 2011 and 2012. Pileated woodpeckers were also detected in 59% of the surrounding surveyed areas of the Middle Fork Clearwater and Selway Rivers. Pileated woodpeckers are common and widespread in the Project area and across the Forest.

Nesting habitat was chosen as the indicator because it is the greatest limiting factor for pileated woodpeckers. Nesting habitat has a narrower range of vegetation conditions when compared to foraging habitat. The Northern Region of the Forest Service summarized available scientific information on the pileated woodpecker (Samson 2006). The report found that the nest tree is the most important variable to estimate breeding habitat use by the pileated woodpecker (). Large snags (>20 inches dbh) were preferred over live trees for nesting in the Northern Rocky Mountains, and nesting occurred in, mature cottonwood bottoms, ponderosa pine, and larch stands but also reported use of mixed conifer and cedar-hemlock. The minimum canopy cover selected by pileated woodpeckers for nesting stands ranges from 15 to 60 percent depending on the habitat type (Bull et al. 1992 Warren 1990, Bull and Holthausen 1993, Bonar 2001).

There are 8,160 acres (19% of the Analysis Area) of currently suitable nesting in the Project area. About 3,000 acres of Douglas-fir habitat was attacked by tussock moth in 2011. Tree mortality is expected to increase in the area in combination with mortality caused by root disease which would provide additional nesting and foraging habitat for woodpeckers.

Population Trends: The pileated woodpecker is rated as secure across its range (global rank G5) and apparently secure (state rank S4) in Idaho (Digital Atlas of Idaho 2010). There are an estimated 9,000 birds in Northern Idaho (Partners in Flight 2007).

Breeding Bird Surveys compiled by the U.S. Geological Survey show an increasing population trend for pileated woodpecker over the past 45 years both at the scale of the Northern Rockies and in Idaho (Sauer et al 2011). The time frame covers almost five decades, including the period when intensive timber harvesting occurred (Bull and Jackson 1995).

Samson (2006) concluded that no scientific evidence exists that indicates pileated woodpeckers are declining in the Northern Region. He indicates 90,441 acres are required to maintain a viable pileated woodpecker population in the Forest Service Northern Region. Bush and Lundberg (2008) show 444,789 acres of foraging habitat and 299,667 acres of nesting habitat on the Nez Perce Forest. Based on Bush and Lundberg's (2008) estimate, the Forest contains over three times more nesting habitat than is needed to provide viability at the Regional level.

3.7.5.13.1 Direct and Indirect Effects

Alternative A—No Action

Root disease is prevalent in the Analysis Area and provides a continuous supply of Douglas-fir and grand fir snags which are suitable nesting and foraging trees. Fire suppression would continue. Fuels in the Analysis Area would continue increasing, making the area susceptible to a stand-replacing fire event. A stand replacing event would create snag habitat for pileated woodpeckers. Snags are currently lacking on 22% of the Analysis Area where regeneration harvest has occurred. Habitat quality would improve in these areas as forests mature over time. Overall, suitable habitat would remain available across the area as forest succession continues.

Alternatives B, C, and D

Under Alternative B, C, and D*, pileated woodpecker populations would be expected to continue to display population stability across the Nez Perce National Forest.* No activities would occur within MA 20 old growth and RHCAs (35%) of the analysis area) which would provide suitable and connected nesting habitat across the Project area.

Regeneration and improvement harvest occurs on 476 acres (6%) of suitable nesting habitat under Alternatives B and C and 373 acres (5%) under Alternative D. Regeneration harvest would reduce habitat quality by simplify habitats by reducing canopy cover and layering, large down wood and standing snags in treated areas. Implementing snag and green tree retention would help limit these effects. Nesting habitat would be available in these areas once canopy closure reaches preferred levels (about 100 years). Commercial thinning would occur on 399 acres (5%) of suitable nesting habitat and would leave 40%–60% of the tree canopy and about 120 overstory trees per acre. Thinning promotes large tree growth and may retain enough structure and canopy to be used by pileated woodpeckers. Removal of some nesting habitat would occur; however snags tend to be limited in these younger stands. The retention of legacy trees, as well as green trees and snags where possible would provide future nesting habitat through time. No landscape burning or improvement harvest occurs in suitable nesting habitat.

3.7.5.13.2 Cumulative Effects

The cumulative effect area is the 43,700-acre Project area, which includes seven old growth analysis areas. The cumulative effects timeframe is 150 years because it would take this long for regeneration harvest areas to develop old-growth habitat. Cumulative effects were also assessed using old-growth forest because pileated woodpecker are an old growth MIS.

Alternative A–No Action

The potential cumulative effects of this alternative are the same as those described under the direct and indirect effects of the No Action alternative. There is a potential for cumulative effects; however levels cannot be determined because estimating the size and severity of potential future fires resulting from fire suppression is not possible.

Alternatives B, C, and D

Proposed treatments under all alternatives would slightly reduce pileated nesting habitat. Fire suppression would maintain closed canopies in untreated areas potentially improving nesting habitat over time. Suppression also increases the risk of stand replacing fire which could remove nesting habitat. Treatments would reduce the crown fire (stand replacement) potential by 7% across the project area. Snags would continue to be available across the landscape in untreated areas especially where insect and disease events occur.

The OGAAs contain 6% to 22% verified old growth (see Old Growth section) which would provide nesting habitat for pileated woodpeckers over time. RHCAs cover 24% of the Project area and would be managed for old growth habitat which would also provide habitat for pileated woodpeckers.

No measurable cumulative effects to pileated woodpecker populations at the local or regional scale, or alteration of current population trend, are expected. This is based on increasing populations and the availability of unaffected suitable nesting habitats in the Analysis Area and across the Forest and region.

3.7.5.14 Rocky Mountain Elk

Elk is a MIS for commonly hunted big game species on the Forest. Elk are habitat generalists and use a diversity of forest types and structures that provide forage and hiding cover. They forage in meadows and early seral communities from spring through early summer, use more closed canopies from late summer through fall and rely upon low elevation, warm aspect, and snow-free or snow-limited areas for foraging in the winter. Adult bulls often winter at much higher elevations than cows and immature elk. Elk also require forest cover for security. Preferred calving sites are generally large meadows, shrub fields, and early seral forest openings in close proximity to water.

Population Trends: Elk populations in the Analysis Area were relatively insignificant until a series of major fire events occurred in 1919, 1928, and 1934. These significantly increased forage availability and population levels. Elk also benefited from predator control efforts.

The Analysis Area falls in the Idaho Department of Fish and game Elk City Elk Management Zone and is in Management Unit 16. Recent (2008) elk population surveys in the unit showed stable cow and slightly elevated bull elk numbers which are slightly up from the 2000 survey. Cow elk numbers currently meet, and bull numbers exceed State population objectives (Table 3-30). However, calf recruitment decreased from 19 calves per 100 cows (from 1990 to 2000) down to 17 in 2008. The calf:cow ratio is an important indicator of population recruitment and long-term herd viability. A ratio of at least 25 calves to 100 cows is needed to offset natural mortality. Reasons for the decline are unclear but may be related to reductions in forage quality (poor condition of cows and low calf weights), high predation rates, less security area, and greater human disturbance and/or hunting pressure.

Table 3-30. Elk winter population status and objectives for Management Unit 16 based on the most recent survey (IDFG 2008)

Management Unit	Survey Year	Current Status			Population Objectives		
		Cows	Bulls	Adults	Cows	Bulls	Adults
16	2008	897	275	238	800–1,200	175–250	100–150

3.7.5.14.1 Elk Winter Range

The Forest Plan (USDA Forest Service 1987b; III-46) designated MA 16 as big game winter range. The goal for MA 16 is to improve the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management practices. Winter range is primarily below 4,500 feet in elevation and has southern-to-western exposures. The vegetative types included are non-forest grasslands, seral brushfields, and timbered lands.

High quality forage is an important component of elk winter range. Elk eat grasses, forbs, and the tips of twigs from some woody vegetation. Shrub fields and conifer forests provide a higher proportion of winter forage than grassland sites. Species such as redstem ceanothus, serviceberry, mountain maple, choke and bitter cherry, and syringa provide much of the winter forage available to elk.

The Analysis Area has 15,600 acres of MA 16 winter range (35% of the Analysis Area). Elk also use non-MA 16 areas. Additional winter range is interspersed in the summer range EAAs. A collaborative effort with the Rocky Mountain Elk Foundation to map elk winter range in Idaho identified approximately 28,798 acres of winter habitat in the Analysis Area (66% of area). Fifty-nine percent of it occurs on the western redcedar/grand fir and Douglas-fir/grand fir breakland settings. Winter habitat occurs on 39% of the western redcedar/grand fir upland setting during more mild winter conditions. Most of the MA 16 winter range is closed to motorized use or part of the Clear Creek Roadless Area, providing high levels of secure habitat during the winter months. Most of the wintering elk in Clear Creek are found in Solo Creek and upper Clear Creek where low open road densities provide security areas from winter recreation disturbances.

Direct and Indirect Effects

Alternative A—No Action

There would be no direct effects to elk winter range under Alternative A because no activities would occur. Winter range forage quality and quantity would decline as tree canopy cover continues to increase due to vegetative succession continues. Insects and disease would continue to create canopy gaps which provide openings for a continuous supply of shrubs, forbs, and grasses, although it is very limited when compared to the forage produced from wildfire. Fire suppression would increase the susceptibility to wildfire due to increased fuel loading. A large fire could significantly increase the amount of winter forage and would decrease cover; however predicting the time and size is not possible. Forage quantity would again decline and hiding cover restored about 20 years after a fire as trees regenerate.

About 2,400 acres of regeneration harvest has occurred in MA 16 with 842 acres occurring since 1990. Sixty-five percent of these areas are too old (>20 years) to provide high quantity

and quality forage. Those occurred since 1990 are moving into the hiding cover stage and only provide low quantities of forage. Alternative A does nothing to create early seral habitats that would provide high quantities of quality forage.

Alternatives B, C, and D

Regeneration and improvement harvest would be conducted on 1,497 acres (10%), 1,925 acres (12%), and 1,104 acres (7%) of MA 16 winter range under Alternatives B, C, and D, respectively. Harvest would reduce elk hiding cover habitat by 10%, 12%, and 7% for the Action Alternatives.

All alternatives use landscape burning on 1,370 acres (9%) of MA 16. Burning in late summer or early fall would increase coverage of shrub species and mimic natural fire seasons. Burning would reduce hiding cover by up to 9% but could be less depending on fire severity.

The proposed treatments would reduce tree canopy cover and allow sunlight, water and nutrients to be more available to shrubs, forbs, and grasses which would increase forage production on winter range. Forage quality may increase as a result of burning. Post-harvest burning in the fall would stimulate resprouting of important shrubs such as redstem and Schouler willow. These two species are often absent from new openings after harvest and may not re-establish in the absence of fire. Orme and Leege (1976) showed that fall burning produced over three times the seedlings than did spring burning. Higher quality forage would benefit cow elk during winter months. Forage quantity would increase for 20–30 years or until tree canopy cover closes and forage plants begin declining. Alternative C (21%) provides the greatest benefit to elk winter forage, followed by Alternative B (19%) and D (16%).

Commercial thinning occurs on 953 acres (6%), 647 acres (4%), and 775 acres (5%) of the winter range under Alternatives B, C, and D, respectively. Thinning would have short term (<10 years) benefits on elk winter range forage. Thinning retains 40-60% of the canopy cover which limits shrub growth. Hiding cover would be slightly reduced under all alternatives.

Precommercial thinning occurs on 560 acres (4%) of the winter range and would have minimal effects on elk winter forage as much of the canopy cover is retained which limits shrub growth.

Cumulative Effects

The cumulative effects analysis is the 43,700 acre Project area. The timeframe is 20 years because this is the time when tree canopy cover would begin to close and reduce the quality of elk winter forage.

Alternative A—No Action

The cumulative effects for this alternative are the same as described under the direct and indirect effects of the alternative. There would be a continued decline in elk winter forage quantity and quality if no wildfires occur. Forage could increase in the event of a wildfire however it is not possible to predict the amount or location.

Alternatives B, C, and D

The Action Alternatives would conduct regeneration or improvement harvest and landscape burning on up to 30% of MA 16 winter range. These treatments would create early seral habitats that provide high quantities of quality forage for about 20 years.

Insects and disease would continue to create openings for the limited growth of shrubs, forbs, and grasses. Fire suppression would continue and fuels would continue to increase in untreated areas. A large fire could significantly increase the amount of winter forage and would decrease hiding cover for elk; however predicting the time and size is not possible. Habitats would be less susceptible to wildfire because proposed treatments reduce crown fire potential on 7% of the Analysis area.

3.7.5.14.2 Elk Summer Range Existing Conditions

The majority of the Analysis Area is considered summer range for elk. Important habitat components for elk include foraging sites, hiding cover, calving areas, rutting, and security areas. Forage availability and abundance has declined throughout the area due to a lack of disturbance (fire, timber harvest) and subsequent increases in tree copy cover. Hiding cover is available in forested stands that are 20 years or older. "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" (Leege 1984) was used to evaluate summer elk range and considers road open road density, livestock grazing, and cover-forage ratios. The Forest Plan objective for summer range EHE is to achieve a minimum of 50% effectiveness in each EAA. There are seven EAA and all units currently meet the objective (Table 3-31).

Table 3-31. Elk summer range habitat effectiveness by alternative in the Clear Creek Analysis Area. *The Forest Plan objective is 50% for each Elk Analysis Area (EAA).*

Elk Analysis Area (EAA)	EAA Acres	Summer Habitat Effectiveness (%)			
		Alternative A Existing	Alternative B	Alternative C	Alternative D
S. Fork Clear Creek	8,117	56	56	56	56
Clear Creek 1	5,060	66	60	60	60
Clear Creek 2	6,371	69	63	62	63
Clear Creek 3	4,702	58	56	53	56
Brown Springs	7,214	80	72	72	73
Solo Creek	5,305	58	52	52	53
Pine Knob	5,301	70	63	62	63

Direct and Indirect Effects

Alternative A—No Action

There would be no direct effects to summer EHE under Alternative A because no activities would occur. Summer range would be more susceptible to wildfire when compared to the Action Alternatives due to increasing fuel loads resulting from fire suppression. A large wildfire would reduce hiding cover in the short-term (10–20 years) but would increase forage. All EAAs would continue to meet the Forest Plan objective of 50% (Table 3-31).

Alternatives B, C, and D

Regeneration and improvement harvest and prescribed fire would remove hiding cover while increasing summer forage in the Project area. Alternative B treats 4, 311 acres (10%), Alternative C treats 5,858 acres (13%), and Alternative C treats 3,760 acres (9%) of the Project area. Forage quantity would increase for 20–30 years and then decline as tree canopy cover closes. Improvements in the quantity and quality of forage would improve the condition of cow elk going into winter and ultimately improve calf survival. Reductions in elk habitat effectiveness occur in all but one EAA under all Action Alternatives (Table 3-31). These result from shifts in the distribution from hiding cover to forage. Reductions occur because some created openings are greater than 800 feet from hiding cover. Elk use in forage areas is reduced when distances to hiding cover exceeds 800 feet (Leege 1984). Although the proposed treatments would reduce EHE, all EAAs remain within the minimum Forest Plan objective (Table 3-31). Elk populations are expected to respond favorably to proposed treatments due to increased foraging opportunities.

Commercial and precommercial thinning has no effect on the calculations for elk habitat effectiveness (Leege 1984).

Cumulative Effects

The geographic boundary for assessing cumulative effects on elk summer habitat effectiveness is the combined seven EAAs within the 43,700 acre Project area. The time frame for cumulative effects is 20 years, which is the time it takes for new plantations to restore elk hiding cover in the harvested areas.

Alternative A- No Action

There would be no direct or indirect, and therefore no cumulative effects to modeled EHE since fire suppression is not considered in the model.

Alternatives B, C, and D- Action Alternatives

There would be no direct or indirect, and therefore no cumulative effects to modeled EHE since fire suppression is not considered in the model. All activities maintain EHE above Forest Plan minimum levels.

3.7.5.14.3 Elk Security Existing Conditions

Security areas are places where wildlife can retreat for safety when affected by disturbance. In general, security areas are over 250 acres in size and >0.5 miles from an open road or trail. The Hillis et al. (1991) guidelines for elk security area recommend that an elk analysis unit have at least 30% secure habitat. All but one EAA meets the recommended guideline (Table 3-32). Unauthorized motorized use is occurring in the Analysis Area but the level is low and seasonally isolated to a few roads.

Table 3-32. Security areas in Clear Creek Elk analysis areas

Elk Analysis Area (EAA) Name	Existing (%)
South Fork Clear Creek	71
Clear Creek 1	51
Clear Creek 2	62
Clear Creek 3	16
Pine Knob*	34
Brown Springs	45
Solo Creek	49

Direct and Indirect Effects

Alternative A—No Action

There would be no direct or indirect effects to elk security since no changes to motorized access would occur.

Alternatives B, C, and D

There would be no direct effect to security areas because none of the alternatives construct permanent roads or change access restrictions on existing roads or trails. Roads proposed for decommissioning are currently closed or are impassable to motorized vehicles due to fallen trees or thick vegetation. Decommissioning would have minimal effects on current elk security. Decommissioning would permanently prevent any future motorized access which would maintain elk security areas indefinitely. Indirectly, regeneration harvest in security areas would create openings and potentially increase vulnerability to hunters. The risk is considered low and with security being reduced from 1% to 11% of security areas. All but one EAA maintains security areas above the recommended 30%. The Clear Creek 3 EAA currently does not meet the recommendation and would be further reduced by 3%. This EAA occurs within the upper West Fork Clear Creek/Hoodoo Creek area and is not likely to ever meet security recommendations due to the number and location of open roads that occur throughout it. Disturbance to individual animals would occur during project implementation but would only last while units are being harvested. The design feature of harvesting units at the far of a road first would reduce disturbance to elk by limiting continuous logging traffic in these areas. Regeneration harvest effects on security would last 20 years until hiding cover is re-established in these areas.

Cumulative Effects

Alternative A—No Action

There would be no direct or indirect, and therefore no cumulative effects to modeled elk security since fire suppression is not considered in the model.

Alternatives B, C, and D

There would be no direct or indirect, and therefore no cumulative effects to modeled elk security since fire suppression is not considered in the model. Road decommissioning from the South Fork/West Fork EA was already considered in the existing condition.

3.7.5.15 Shiras Moose

Moose are a Forest MIS representing hunted big game species and old-growth/Pacific yew habitats. Moose in north-central Idaho select dense Pacific yew stands in old-growth grand fir communities during winter (Pierce and Peek 1984). Suitable habitats are characterized by an overstory of old growth grand fir and an understory of Pacific yew (a primary winter forage species for moose). An increase in the frequency and extent of yew has likely resulted from fire suppression; however timber harvest has likely reduced it in these same areas. Pacific yew was typically slashed and burned during regeneration timber harvest practices prior to 1987 (Crawford 1983 and Stickney 1980). From 1987 to 1991, harvest and burning were constrained in areas allocated to moose winter range. Since 1992, timber harvest and burning in Pacific yew stands have been reduced considerably based on the Conservation Guidelines for Pacific Yew (USDA 1992). Past harvest has reduced patch size and interior conditions, and isolated Pacific yew stands.

The Forest Plan designated MA 21 as grand fir/Pacific yew communities to be managed for moose winter range. The goal in MA 21 is to provide for the continuing presence of Pacific yew suitable for moose winter habitat. The Forest Plan contains Management standards and practices for timber harvest and fire management can be found in the Forest Plan (USDA Forest Service 1987b, pg. III-59).

There are 3,686 acres (8%) of MA 21 in the Analysis Area and of it all occurs in the southern third of the area. There are 2,700 acres (77%) of currently suitable moose winter range habitat in MA 21. The other 23% is not suitable due to past harvest, most of which occurred in, or prior to, the 1980s. Harvest resulted in the creation of patchy areas of suitable habitat. There are 8 patches ranging in size from 8 to 2,658 acres (mean=599). The two largest patches are over 1,400 acres. Past timber harvest and postharvest site preparation (hand, mechanical, and burning) reduced the winter habitat suitability for moose through the removal of the conifer overstory and the Pacific yew understory.

The Forest Plan limits the amount of MA 21 regeneration harvest to 5% per decade and prescribes the retention of 50% of the live yew component scattered throughout the harvest unit in one-quarter to one-half acre patches. The preferred harvest type is patch clearcuts (preferably 5-10 acres and no more than 20 acres), individual tree selection, group selection or shelterwood. Leave strips between yew stands should also be retained to provide travel corridors for moose.

There is additional moose winter range totaling 8,156 acres outside of MA 21 in areas of subalpine fir (VRUs 1 and 10) and in smaller patches of grand fir/ yew in the headwater of the Project area (VRU 7). These are included in the effects analysis below but do not require the same Forest Plan guidelines as MA 21. Desired conditions for these areas are to retain a variety of conifer species including grand fir, Engelmann spruce, subalpine fir, western red cedar, Douglas-fir, western larch, lodgepole pine, and Pacific yew. These areas help to

support moose populations in the project area. Suitable and potential summer range for moose is available throughout the mid- and upper elevations of the Analysis Area.

Peek et al. (1987) recommended no more than about 45% of MA 21 should be in an age class younger than 90 years, and no more than 14% should be logged in any 30-year period. Roughly 835 acres (23%) of MA 21 is currently younger than 90 years old and 388 acres (11%) was harvested between 1982 and 2012. The area currently meets these recommendations.

Population Trends: The Analysis Area is in IDFG Management Unit 16. Moose are managed where populations are large enough to support controlled hunts. Management Unit 16 currently has 4 antlered moose harvest permits which is down from 14 to 17 permits issued since 2000. Population levels of moose have fluctuated noticeably over time. Several sets of moose tracks were observed both within MA 21 and outside of it during field surveys.

3.7.5.15.1 Direct and Indirect Effects

Alternative A—No Action

There would be no direct or indirect effects under this alternative since no activities would occur. MA 21 habitats would continue to provide moose winter habitat. Old grand fir trees would die of insects and disease, creating canopy gaps where small patches of regenerating trees would develop. This process would perpetuate the multistory conditions characteristic of grand fir/Pacific yew winter range. Outside of MA 21, in VRUs 1, 7, and 10, this process would also occur.

Alternatives B, C, and D

Regeneration harvest would occur on 130 acres (3%), 161 acres (4%), and 49 acres (1%) of MA 21 for Alternatives B, C, and D, respectively. This harvest type would reduce mature grand fir levels within treatment units, limiting the development of future old growth grand fir. Design features would limit patch size and retain overstory trees and existing Pacific yew in order to maintain a presence and perpetuate moose winter range. Regeneration harvest in MA 21 may slightly fragment moose winter habitat, but silvicultural prescriptions consistent with the Forest Plan would be applied to minimize effects. All grand fir and Pacific yew would be retained within PACFISH buffers which would provide a future seed source for grand fir and yew and also provide travel corridors for moose. None of the Action Alternatives would exceed the 5% per decade harvest requirement for MA 21.

Regeneration harvest would occur on 329 acres and 345 acres (4%) under Alternatives B and C, and 255 acres (3%) for Alternative D, outside of MA 21 on moose winter range. Mature grand fir trees would be removed within treatment units, limiting the development of old growth grand fir. All trees, including grand fir and yew (in VRU 7) would be retained within PACFISH buffers which would provide a future seed source for grand fir and also provide moose travel corridors. Moose summer and winter habitat would continue to be available.

Precommercial thinning would occur on 283 acres (8%) of MA 21 under all alternatives. Commercial thinning would occur on 363 acres (10%), 332 acres (9%), and 298 acres (8%) of MA 21 under Alternative B, C and D respectively.

Precommercial thinning would occur on 248 acres (3%) outside of MA 21 on moose winter range. Commercial thinning activities would occur outside of MA 21 on moose winter range on 625 acres (8%) for Alternative B and 581 acres and 607 acres (7%) for Alternatives C and D. Thinning would not affect suitable moose winter habitat as little to no Pacific yew remains in the stands due to past harvest and site preparation. Thinning would favor early seral species and Douglas-fir limiting the availability of grand-fir in the future. Some grand fir is present and would be retained in the stands due to tree spacing requirements and natural regeneration as stands age. Grand fir would also be retained in PACFISH buffers which would provide a future seed source for the species and suitable habitat for moose.

The Alternatives B and D would meet both recommendations as described by Peek et al. (1987). Alternative C would exceed the amount of regeneration harvest over a 30 year period by 1%. Alternative B, C, and D would increase harvested areas to 14%, 15%, and 12%, respectively. The amount of stands under the age of 90 years would be increased to 26%, 27, and 24% for each of the alternatives, respectively and would remain well below 45%.

3.7.5.15.2 Cumulative Effects

The cumulative effects area is the 43,700 acre project area. This area contains all MA 21, all grand fir/yew habitats, and provides general moose habitat. The time frame for cumulative effects is 30 years as that is the time it takes for a closed canopy to develop over understory yew trees in harvest units with Forest Plan MA 21 retention requirements.

Alternative A- No Action

There could be minor cumulative effects under this alternative from fire suppression which would increase the risk of stand replacing fire in the Project Area. This type of fire could kill existing yew and create large canopy openings where yew would have low survival. Predicting the size and severity of wildfire is not possible so the level of potential cumulative effects cannot be determined.

Alternatives B, C, and D

The Action Alternatives would reduce grand fir habitat slightly (<4%) but would be within Forest Plan guidelines for MA 21. Project activities would reduce the risk of stand replacing fire on 7% of the Project area which would reduce the potential impacts to MA 21 and other moose habitat. Fire suppression would continue but the risk of fire would be lessened under these alternatives when compared to the No Action Alternative. Predicting the size and severity of wildfire is not possible so the level of potential cumulative effects cannot be determined.

3.8 WATERSHED

This section summarizes the effects of the alternatives on the watershed resources. This section was summarized from the "Clear Creek Restoration Project Watershed Report," located in the project record.

3.8.1 Analysis Area

The Clear Creek Integrated Restoration Project encompasses 43,730 acres within the Clear Creek watershed (5th field HUC #1706030401). Clear Creek is a tributary to the Middle Fork Clearwater River.

The direct and indirect effect areas for the sediment yield and road density indicators are the 10 Forest Plan prescription watersheds. The effect areas for the water yield indicator are the 3 subwatersheds (6^{th} field HUC) within the project area: Upper Clear Creek, South Fork Clear Creek, and Lower Clear Creek. The cumulative effects area for all indicators is the Clear Creek watershed (5^{th} field HUC).

3.8.2 Regulatory Framework

Nez Perce Forest Plan direction and all federal and State laws and regulations applicable to watershed resources would be applied to the Clear Creek project, including the Clean Water Act, Idaho Water Quality Standards, Idaho Forest Practices Act, Idaho Stream Channel Protection Act, and EOs 11988 and 11990.

The Clear Creek project was designed to comply with the Clean Water Act, Idaho Water Quality Standards, Idaho Forest Practices Act, Idaho Stream Channel Protection Act, and EOs 11988 and 11990. All major streams in the project area would have improved or maintained water quality conditions and would continue to support beneficial uses.

3.8.2.1 Nez Perce National Forest Plan

Forest standards for water resources are found in the Nez Perce National Forest Plan on pages II-21 through II-22 (USDA Forest Service 1987b) and include the following:

- Apply BMPs to project activities to ensure water quality standards are met or improved.
- Use R1/R4 sediment and water yield guidelines.
- Evaluate site-specific water quality effects and complete cumulative watershed effects analysis.
- Meet fish/water quality objectives as outlined in Forest Plan Appendix A (including Forest Plan amendments 5, 11, and 26). Guidelines for percent sediment yield over base and for entry level frequency per decade are established to approximate the maximum sediment yield allowable to meet fish/water quality objectives.

The Forest Plan was amended in 1995, following a joint decision (commonly called PACFISH) by the U.S. Forest Service and BLM for managing anadromous fish-producing watersheds on federal lands (Forest Plan Amendment 20). This amendment also includes direction for restoration opportunities and cooperation with other agencies and individuals. PACFISH buffer widths exceed State BMP standards.

Forest Plan standards for water quality (USDA Forest Service 1987b, pp. II-21 to II-22 and Appendix A) apply to this project, and compliance would be achieved via project design features, BMPs, effects analyses, and field reviews (Table 3-33).

Table 3-33. Compliance with Nez Perce National Forest Plan water standards

Standard Number[a]	Subject Summary	Compliance Method
Nez Perce Forest Plan Standards		
1	Apply Idaho Water Quality Standards and BMPs.	Project design features and BMPs listed in Chapter 2
2	Utilize R1/R4 sediment yield and R1 water yield guidelines.	Effects analysis
3	Evaluate site-specific water quality effects.	Field reviews (conducted in 2011 and 2012)
4	Complete watershed cumulative effects analysis.	A cumulative watershed effects analysis for the Middle Fork Clearwater River was completed for this project.
8	Meet fish and water quality objectives in Forest Plan Appendix A (includes Forest Plan amendments 5, 11, and 26). Eight of 10 prescription watersheds have an upward trend requirement.	Project design features and BMPs listed in Chapter 2
Forest Plan Amendment 20 (PACFISH)		
WR-1	Promote ecological integrity through watershed restoration projects.	Project design features
WR-2	Cooperate with agencies, tribes, and private individuals.	Ongoing cooperation
WR-3	Prevent degradation (restoration is not a substitute for preventing degradation).	Project design features

[a] Standards 5, 6, and 7 do not apply within the context of this project.

3.8.2.2 Clean Water Act

The Clean Water Act stipulates that states are to adopt water quality standards. Included in these standards are provisions for identifying beneficial uses, establishing the status of beneficial uses, setting water quality criteria, and establishing BMPs to control nonpoint sources of pollution. EO 12088 also requires the Forest Service to meet the requirements of the Clean Water Act.

Section 313 of the Clean Water Act requires federal agencies to comply with all federal, state, interstate, and local requirements with respect to control and abatement of water pollution, and to cooperate with relevant processes and sanctions and administrative authority.

Section 303(d) of the Clean Water Act stipulates that states must identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. No streams in the project area are listed for pollutants in the EPA-approved 303(d)/305(b) 2010 Integrated Report (IDEQ 2011).

Section 404 of the Clean Water Act requires permits to dredge or fill within waters of the United States. The U.S. Army Corps of Engineers administers these provisions. Culvert removal and replacement activities proposed under the Clear Creek project would require authorization under section 404, through application of either nationwide or site-specific permits.

Section 402 of the Clean Water Act discusses permitting under the National Pollutant Discharge Elimination System (NPDES). The Clear Creek project may require an NPDES permit. A recent court case, *Northwest Environmental Defense Center v. Brown*, 640 F.3d 1063 (9th Cir. 2011), held that stormwater runoff associated with logging roads that flows into systems of ditches, culverts, and channels before being discharged into forest streams and rivers is a point source discharge requiring an NPDES permit. Because the Forest Service was not a party to the case, the Ninth Circuit's decision did not impose any affirmative duties on the Forest Service.

Permanent legislation is pending in both the U.S. Senate and the House of Representatives that would amend section 402 of the Clean Water Act to exempt stormwater discharges resulting from silvicultural activities from NPDES permit requirements.

Due to these factors, potential NPDES permitting requirements for stormwater discharges from logging roads in the Clear Creek project area are still uncertain. If legislation should determine that an NPDES permit is required for this project, the Forest Service will comply with any applicable NPDES permitting requirements.

3.8.2.3 Idaho Water Quality Standards

EPA regulations require each state to adopt an antidegradation policy as one component of its water quality standards. The objective of the Idaho Anti-degradation Policy is, at a minimum, to maintain and protect existing instream water uses and the level of water quality necessary to protect those uses (IDAPA 16.012501.01). Beneficial uses and water quality criteria and standards are identified in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02, IDAPA 37.03.02).

3.8.2.3.1 Idaho Forest Practices Act

This legislation regulates forest practices on all land ownership in Idaho. Forest practices on NFS lands must adhere to the rules pertaining to water quality (IDAPA 20.02.01). These rules are also incorporated as BMPs in the Idaho Water Quality Standards.

3.8.2.3.2 Idaho Stream Channel Protection Act

This legislation regulates stream channel alterations between mean high water marks on perennial streams in Idaho. Instream activities on NFS lands must adhere to the rules pertaining to the Idaho Stream Channel Protection Act (IDAPA 37.03.07). These rules are also incorporated as BMPs in the Idaho Water Quality Standards.

3.8.2.3.3 Executive Orders 11988 and 11990

These orders provide for protection and management of floodplains and wetlands.

3.8.3 Resource Indicators

Water Quality and Quantity: All Clear Creek project activities should maintain or improve water quality. The Clear Creek project would therefore be designed to produce no measurable increase in bacteria, nutrients, oil and grease, inorganics, sediment, or temperature.

The balance of water yield and sediment yield in a watershed influences the water quality/quantity of a stream system. Water yield refers to stream flow quantity and timing

and is a function of water, soil, and vegetation interactions. Changes in amount or distribution of vegetation can affect water yield and ultimately alter stream channel conditions. A measurement of 25%–30% equivalent clear-cut area (ECA) is generally recognized as an indication that water yield has increased beyond acceptable limits (Gerhardt 2000).

Active erosion of the landscape yields sediment to streams and occurs naturally. When an excess of sediment—that is, over the natural (balanced) amount—is delivered to a stream, the stream's ability to route the sediment out of the system is diminished, and water quality is reduced. Harvest and road-related activities have the potential to increase erosion production and sediment delivery into streams.

Roads influence both water quantity and quality. Roads concentrate surface water and are a source of sediment entering streams. Watershed road densities >3 miles per square mile (mi/mi^2) are categorized as low condition (i.e., poor conditions for watershed resources) (NOAA 1998).

Resource Indicators:

- Percent increase in ECA
- Percent sediment yield increased over base (natural), as modeled by NEZSED
- Reduction in watershed road miles

3.8.4 Analysis Methodology

GIS-generated reports and maps, aerial photos, and field reviews were used to analyze effects to water quality and quantity from the Clear Creek proposed activities. Resource condition observations were conducted in the field during 2011 and 2012. Headwater channels, ephemeral swales, and springs/seeps in the proposed treatment units and downstream of them were examined and recorded on a map. Forest stand database (FSVeg) queries were conducted to identify past harvest activities and the time frame during which they occurred (see project file). Information from the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001) and from the Clear Creek Watershed NFMA Assessment (2012) was used to develop the existing condition and cumulative effects evaluation.

Models were used to provide estimates, not absolutes, for comparison of alternatives. An ECA analysis using treatment and recovery coefficients from Ager and Clifton (2005) was conducted to determine existing and percent increase in ECA.

The NEZSED model was used to estimate the predicted percent increase in sediment yield over base (natural) conditions to determine if thresholds from Forest Plan Appendix A would be exceeded. The methodology for using the NEZSED model is described in detail in the Forest's guidance document, Implementation Guide to Appendix A of the Nez Perce National Forest Plan (Conroy and Thompson 2011). Sediment yield is calculated in tons per year and reported as "percent increase over base" conditions. Sediment yield is calculated for base conditions (without management activities), current conditions (cumulative of past and existing management activities combined with base conditions), and predicted conditions (cumulative of past, existing, and proposed activities combined with base conditions) for each of the proposed project alternatives. These percentages of sediment yield over base

conditions are then compared to the sediment yield guidelines for prescription watersheds listed in Appendix A of the Forest Plan. Disturbance entries or the numbers of large activities in a decade are also calculated to compare with guidelines established in Appendix A of the Forest Plan.

Additional information about the models used in this analysis can be found in the project file.

3.8.5 Affected Environment

3.8.5.1 Watershed Descriptions

The Clear Creek project area (43,730 acres) is encompassed by the Clear Creek watershed, which flows into the Middle Fork Clearwater River. The 58,990-acre Clear Creek watershed contains 3 subwatersheds: Upper Clear Creek, South Fork Clear Creek, and Lower Clear Creek. These subwatersheds are divided into 10 Forest Plan prescription watersheds. The existing conditions of the watersheds are shown in Table 3-34. Watershed boundaries and stream locations are displayed in Figure 3-8 and Figure 3-9. No municipal water supplies or source waters are within, adjacent to, or downstream of the project area. The entire Clear Creek drainage is 65,000 acres; however, the Leitch Creek and Little Cedar Creek subwatersheds were not considered in the analysis, as they have no Forest Service ownership within them.

A search of water rights applications, permits, decrees, licenses, claims, and transfers was made for the areas located in the Clear Creek project area. Twenty water rights were identified: 19 for the U.S. Forest Service and 1 for the State of Idaho. Uses include minimum stream flow, stock water, and federal reserved use. Further details of each water right are located in the project file.

The proposed action alternatives analyzed for this project would not alter any existing water rights claims or decrease the available water relative to these claims.

Table 3-34. Existing condition information for Clear Creek watersheds

Drainage	Watershed Acres (100% Forest Service [FS] land unless indicated)	Percent of Forest Service Land with Past Harvest (1956–2012) (%)	Road Density (miles/mile^2)[a]	Percent Equivalent Clearcut Area (ECA) (%)
Clear Creek 5th field HUC	58,990 (72% FS)	26	2.7	4
Upper Clear Creek 6th field HUC	19,166 (97% FS)	36	3.1	3
Pine Knob Creek Forest Plan	2,622	50	4.8	—
Browns Spring Creek Forest Plan	3,057	40	4.1	—
Clear Creek[b] Forest Plan	7,234 (91% FS)	31	2.3	—
Solo Creek Forest Plan	2,226	51	3.5	—
Middle Fork Clear Creek Forest Plan	4,025	26	2.4	—
South Fork Clear Creek 6th field HUC	16,478	14	1.8	2
Kay Creek Forest Plan	3,537	13	2.5	—
South Fork Clear Creek Forest Plan	12,941	14	1.6	—
Lower Clear Creek 6th field HUC	23,346 (33% FS)	40	3.0	7
Hoodoo Creek Forest Plan	6,446	38	3.8	—
Big Cedar Creek[b] Forest Plan	5,542 (13% FS)	70	4.6	—
Lower Clear Creek Face[b] Forest Plan	11,358 (5% FS)	5	1.8	—

[a] Includes the 10 miles of decommissioning under decision of 2011 South Fork/West Fork Clear Creek Road Decommissioning EA; total watershed.
[b] ECA and road density calculations include privately owned land portions of the watershed.

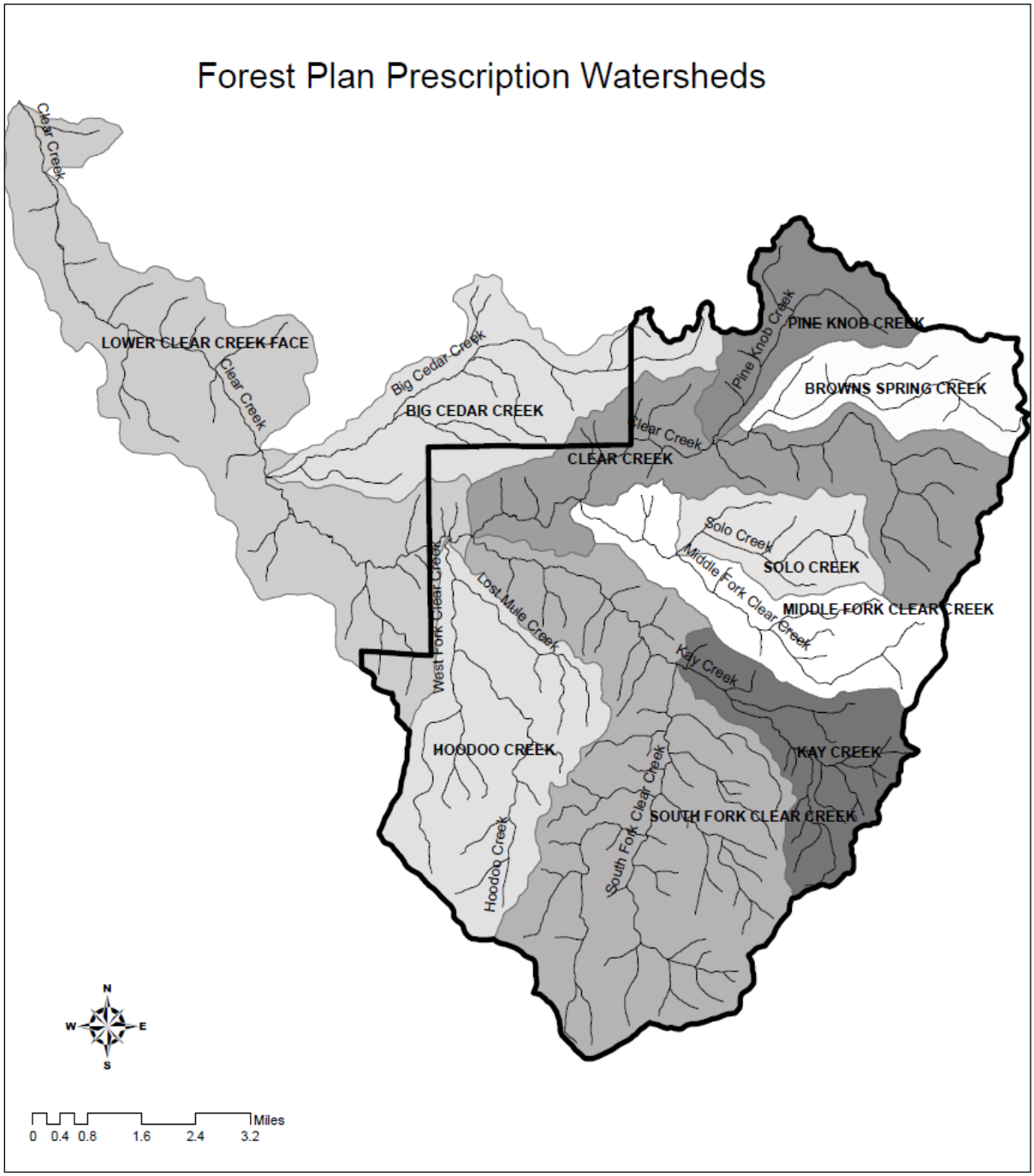

Figure 3-8. Forest Plan prescription watersheds and major streams in the Clear Creek watershed

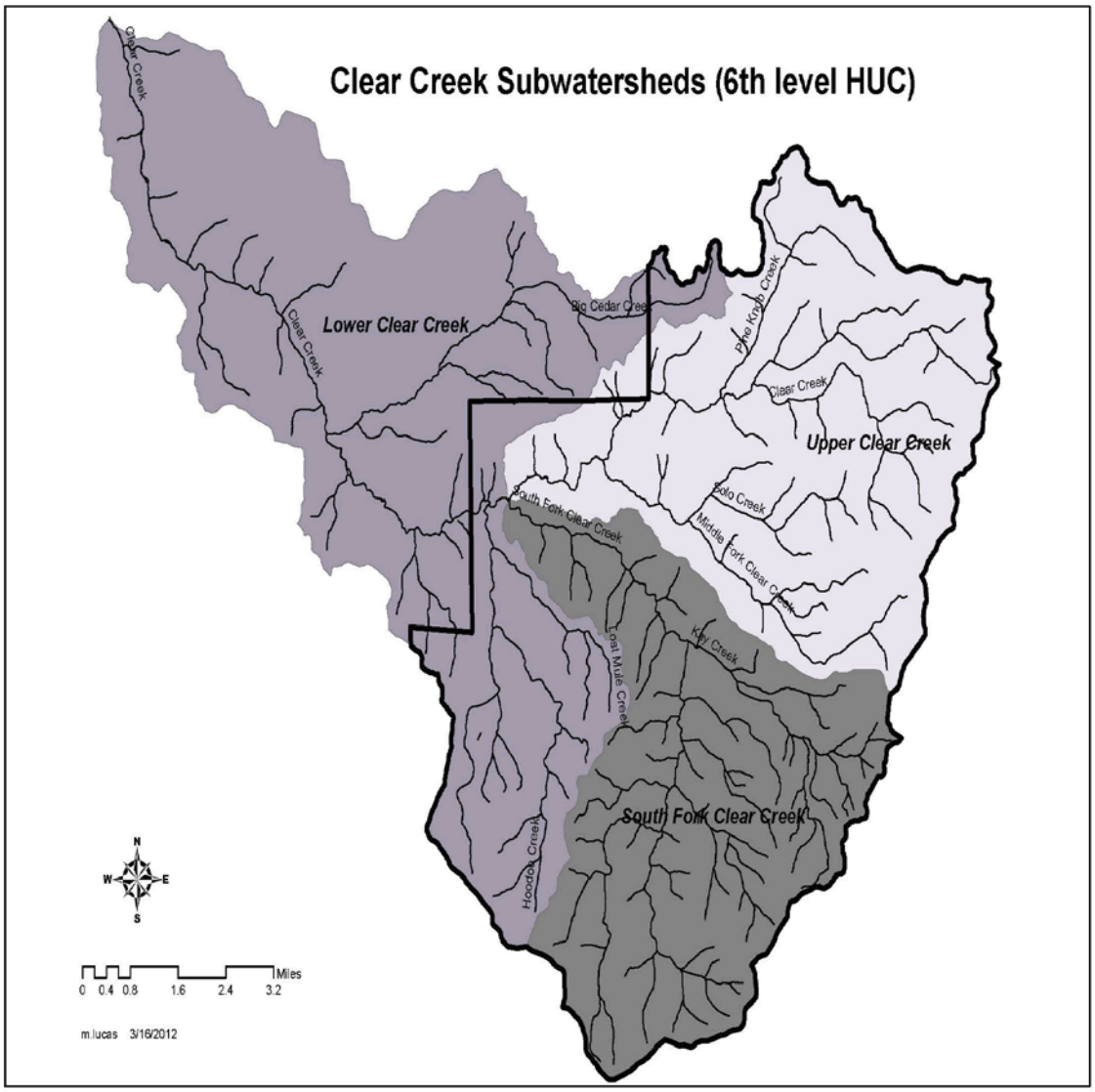

Figure 3-9. Clear Creek subwatersheds (6th level HUC)

Forested seeps and springs are found throughout the project area and often mark the upper extent of perennial flow. Stream channels range from headwater channels that are relatively steep and confined (Rosgen A) to lower-gradient Rosgen B and C channels (Rosgen and Silvey 1996).

During the summers of 2011 and 2012, resource specialists evaluated conditions of headwater perennial and intermittent channels, ephemeral draws, and springs and seeps within and downstream of the proposed project area. In addition, temperature data and instream channel conditions of major streams were gathered (see fisheries report). Channels are primarily stable, not entrenched, and are fully accessible to their floodplains (which are generally less than 30 feet wide). Banks are stable, and channel substrate consists of silts and sands, gravels, and cobbles. Ephemeral draws show no evidence of downcutting. In many of the larger stream channels, bank cutting and deposition from 2011 runoff events were noted. Runoff data obtained from *Streamstats* (USGS) show that runoff in the Clear Creek

watershed was in the >90 percentile range for 2011, indicating flows higher than usual for the area. These streams are in a stable condition, with balanced cutting and deposition. Stream bank damage was noted in locations where livestock cross streams or drink. The amount of disturbance was minimal and mostly near closed-road stream crossings.

Beneficial uses and water quality criteria and standards are identified in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02). Designated Beneficial Uses (IDAPA 58.01.02, Section 120) for the Middle Fork Clearwater River Subbasin are cold water biota, salmonid spawning, domestic water supply, and primary contact recreation. Designated Beneficial Uses for Pine Knob Creek, Browns Spring Creek, and Clear Creek (mainstem) are cold water biota, secondary contact recreation, and salmonid spawning. The Idaho Department of Environmental Quality (IDEQ) has determined that the streams are fully supporting those beneficial uses (IDEQ 2010 Integrated Report 2011). For those streams not individually listed (undesignated surface waters), beneficial uses include cold water biota and secondary contact recreation. Solo Creek and Middle Fork Clear Creek were found to be fully supporting these beneficial uses, while Kay Creek, South Fork Clear Creek, Hoodoo Creek, and Big Cedar Creek have not been assessed.

The IDEQ direction is to improve or maintain water quality conditions in order to support beneficial uses. No streams within the Clear Creek drainage are listed for impairment by pollutants in the EPA-approved 2010 IDEQ 303(d)/305(b) Integrated Report (IDEQ 2011).

Conditions in the Clear Creek project area are a result of both natural processes and human activities. Past human-related activities include recreation, fire suppression, road building and maintenance, and harvest activities (1950s–2000s). Past harvest and associated road construction have had the most impact, with some increases in water yield and sediment yield. Harvest activities (Forest Service lands only) have occurred on 5%–70% of each watershed in the Clear Creek project area Table 3-34.

Water Yield: Compaction, disturbance, or removal of the ground surface and disturbance or removal of vegetation can alter water yield. Water yield refers to stream flow quantity and timing; water yield measurements are important because stream flow is a key determinant of the energy available for erosion, transport, and deposition of sediment within channels. Increased water yields may be associated with channel scour, bedload movement, or redistribution of sediment in depositional areas.

Water yield generally increases after vegetative treatments, due to a reduction in transpiration and precipitation interception losses. Removal of forest canopy can increase snowpack accumulation and melt rates, thereby increasing runoff rate and volume. The presence of roads and skid trails typically increases overland flow due to soil compaction; these impacts are similar to those of canopy removal from timber harvest.

No federal, State, or Nez Perce Forest Plan standards govern peak flow increases in Idaho. The Forest Plan calls for maintaining the stability, equilibrium, and function of all streams on the Forest. ECA is often used as an indicator of potential changes in water yield and represents the amount of forest canopy openings in the watershed. Existing roads are considered permanent openings in ECA estimates. The ECA method should only be applied to relatively large vegetation management projects where proposed timber harvest or fuel treatments (or both) would affect large proportions of 6th code hydrologic units. Analysis of water yield is probably not necessary for treatments that remove 20% or less of basal area,

because the effects are not likely measurable (Troendle et al. 2009). Effects of thinning, fuel treatments, and partial cuts on water yield are likely to be short-lived and may not even be measurable (Troendle et al. 2009).

An ECA analysis using treatment and recovery coefficients from Ager and Clifton (2005) was conducted to determine the existing ECA condition. Past harvest, wildfire, and roads were included in the analysis. Existing ECAs at the 6th field HUC scale range from 2% to 7% (Table 3-34). Each of the subwatersheds is considered in high (good) condition of <15% ECA (NOAA 1998).

Sediment Yield: Active erosion of the landscape yields sediment to streams and occurs naturally or as the result of management activities. When an excess of sediment—that is, over the natural (balanced) amount—is delivered to a stream, the stream's ability to route the sediment out of the system is diminished, and water quality is reduced.

Prescription watersheds were assigned fish/water quality objectives in Appendix A of the Forest Plan. These objectives provide management direction in terms of the maximum estimated increase in sediment over baseline conditions that can be approached or equaled for a specific number of years per decade. In 1987, eight of the Forest Plan prescription watersheds did not meet their fish/water quality objectives, and sediment was the primary limiting factor. These same watersheds have an Upward Trend Requirement, which allows timber management to occur, concurrent with improvement efforts, as long as a positive, upward trend in habitat carrying capacity is indicated. Objectives for Big Cedar Creek and Lower Clear Creek Face were not designated, nor were sediment yield guidelines assigned. The sediment yield guidelines (the maximum sediment yield allowable to meet fish/water quality objectives) for each watershed are shown in Table 3-37. Appendix A of the Forest Plan also assigned entry frequency guidelines for each of the watersheds. Few activities have occurred in any of the watersheds in the past 10 years to qualify as an entry, when considering sediment production. The most recent harvest was the Middle Fork timber sale in the Pine Knob Creek drainage in 2005.

Roads are a source of sediment to streams, particularly at culvert inlets where cutslope slumping occurs and on roads in need of more drainage structures. Road densities within the prescription watersheds range from 1.6 to 4.8 mi/mi^2. A watershed in high (good) condition generally has a road density of <1 mi/mi^2. Watersheds with 1–3 mi/mi^2 are rated as moderate, and those with >3 mi/mi^2 are rated as low (poor) condition (NOAA 1998). Of the 10 Forest Plan prescription watersheds, 5 are rated as moderate condition, and 5 are rated as low condition Table 3-34. The baseline road miles for this project include the 10 miles of road decommissioning that occurred under the South Fork/West Fork Clear Creek Road Decommissioning 2011 decision.

3.8.6 Environmental Consequences

3.8.6.1 Direct and Indirect Effects

Direct and indirect effects areas are the 10 Forest Plan prescription watersheds that contain Clear Creek project activities; these areas represent the lowest level at which effects would be seen.

3.8.6.1.1 Alternative A—No Action

Under this alternative, no proposed management actions would occur. Actions occurring on state and private lands would continue. Because no vegetation removal or ground-disturbing activities would occur, no direct effects would result from this alternative. Under Alternative A, road density and road-related erosion (indirect effects) would remain unchanged. Benefits from the reconditioning, reconstruction, and decommissioning of roads, proposed as part of the action alternatives, would not be attained. These roads would continue to be a potential source of sediment and would continue to intercept water and reroute it to stream systems.

Alternative A does not propose any new activities that would directly or indirectly affect wetlands or floodplains or increase water temperatures.

3.8.6.1.2 Alternatives B, C, and D—Action Alternatives

Regeneration, Improvement, and Commercial Thinning

The effects of vegetative manipulation on water yield are complex, highly variable, and dependent on many independent factors such as elevation, climate, aspect, and especially precipitation. Removal of vegetation has the potential to increase stream flow in the short term (0–10 years) due to changes in evaporation, precipitation, wind patterns, and soil infiltration and percolation (Fowler et al. 1987; Dunne and Leopold 1978).

Alternative B proposes 2,609 acres of regeneration, 5,606 acres of commercial thinning, and 331 acres of improvement. Alternative C proposes 4,156 acres of regeneration, 4,220 acres of commercial thinning, and 331 acres of improvement. Alternative D proposes 2,178 acres of regeneration, 5,141 acres of commercial thinning, and 211 acres of improvement. Table 3-35 displays vegetation removal activities by alternative for the three 6th field HUC subwatersheds. The most harvest occurs under Alternative C, followed by Alternative B, then D. Harvest activities were assessed using ECA and the NEZSED model.

Table 3-35. Vegetation removal activities, by subwatershed (6th field HUC)

Subwatershed (6th field HUC)	Upper Clear Creek			South Fork Clear Creek			Lower Clear Creek		
	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D
Regeneration	1,209	1,486	993	698	868	518	700	1,798	667
Commercial thin	2,774	2,625	2,699	883	714	719	1,946	880	1,720
Improvement	227	227	140	0	0	0	97	98	65
Temporary roads outside units	9.1	9.1	5.2	3.5	3.5	2.9	5.7	5.7	1.9
Prescribed burn	601	601	601	326	326	326	445	445	445

Note: Does not include precommercial thinning

ECA is used as an indicator of change in water yield or peak flows resulting from reductions in forest canopy (thinning and harvest-related activities). The ECA analysis takes into account the initial percentage of crown removal and the recovery through vegetative regrowth since the initial disturbance. Existing roads are considered permanent openings in ECA estimates. The analysis takes a simple snapshot in time, with the assumption that all Clear Creek project activities would be implemented in 1 year. ECA predictions are used to compare alternatives and are not viewed as absolutes. This water yield indicator serves only

as a red flag that suggests a potential for decreased stability due to sustained increased energy in the stream channel.

The ECA method was developed to address concerns about water yield increases and potential effects on channel morphology. In the early 1970s, channel impacts (primarily scouring) were often observed, and these impacts were thought to be caused by water yield increases. During that period, clear-cutting was common, timber harvest levels were substantially higher, and impacts to streams were common. Forest management practices have changed dramatically since that time. Streams have buffers of 100–300 feet on both sides of the watercourse, and BMPs are implemented on all projects. All of these changes have greatly reduced the impacts of forest management on stream channels and aquatic habitat.

The estimated percent increase in ECA from harvest activities, temporary road construction, and prescribed burning ranges from 6% to 15%, depending on watershed and alternative (Table 3-36). When these increases are added to the existing ECAs, they produce ECA estimates that predict what watershed conditions will be like after the Clear Creek project. These ECA estimates range from 9% to 18% for Alternatives B and C, and from 7% to 16% for Alternative D. The highest increases in ECA occur under Alternative C, followed by Alternative B, then D.

Table 3-36. Estimated percent increase in Equivalent Clearcut Area (ECA) from project activities (6th field HUC)

Subwatershed	Existing ECA[a]	Estimated Increase in Percent ECA from Project Activities			Final Percent ECA (Existing plus Project)		
	Alt. A	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D
Upper Clear Creek	3	15	15	13	18	18	16
South Fork Clear Creek	2	7	7	6	9	9	7
Lower Clear Creek	7	8	9	7	14	16	14

Note: Vegetation removal activities include prescribed burning, regeneration, commercial thinning (but not precommercial thinning), improvement, and construction of temporary roads.
[a]ECA calculations include privately owned land portions of the watershed.

A lower ECA indicates a higher (better) watershed condition. At the 6th field HUC level, ECAs of <15% indicate high (good) condition. ECAs of 15%–30% indicate moderate condition, and ECAs of >30% are considered low (poor) condition (NOAA 1998). Watershed condition for the ECA indicator would move from high condition to moderate condition for the Upper Clear Creek subwatershed for all action alternatives and for Lower Clear Creek subwatershed for Alternative C. These numbers are at the low end of the moderate category. As stated above, these ECA estimates are based on the assumption that all project activities would occur in 1 year. In reality, these activities would be staggered over several years.

Much research has been conducted on harvest activities and the potential for increased peak flows and water yield. Most of these studies looked at clear-cut activities in areas with openings of >2–5 tree heights and no riparian buffers. Regeneration harvest accounts for <8% of any of the subwatersheds. Proposed variable tree retention levels of 14–22 tpa would result in openings of 50–100 feet (1 tree height), on average. Field assessments confirmed

that streams in the project area are in stable condition, and changes in channel conditions are not expected to occur.

Ground-disturbing harvest activities can also increase sediment loads in the intermittent and small perennial channels within and adjacent to treatment units (0–2 years). Topography, retained woody material, and PACFISH buffers would capture and store most of the material. As ground cover is reestablished, hillslope erosion would diminish (0–3 years).

The NEZSED model was used to estimate the predicted percent increase in sediment yield from the proposed activities under Alternatives B, C, and D. The predicted increases in sediment production by the NEZSED model are for relative comparison to existing conditions and do not reflect actual instream sediment yields expected from the project. The NEZSED model results have their primary utility in comparing differences between each proposed alternative and the existing condition; model results are also useful for comparing the proposed alternative to the guidelines of Appendix A of the Forest Plan. A more detailed discussion of the NEZSED model is in the Forest Plan Appendix A guidance document (Conroy and Thompson 2011).

As shown in Table 3-37, each of the prescription watersheds would remain below the sediment yield guidelines allowable under Forest Plan Appendix A (USDA Forest Service 1987b), under all alternatives. The highest increases were found in Alternative C, followed by Alternative B, then D.

Table 3-37. NEZSED estimated sediment yield

Forest Plan Prescription Watershed[a]	Percent over base				
	Existing	Alternative B	Alternative C	Alternative D	Appendix A Allowed
Pine Knob Creek	1.2	16	16	16	45%
Browns Spring Creek	2.0	23	24	21	45%
Clear Creek	0.8	7	7	5	30%
Solo Creek	1.5	16	16	14	45%
Middle Fork Clear Creek	1.0	8	8	5	30%
Kay Creek	1.5	3	3	2	45%
South Fork Clear Creek	0.6	5	6	4	45%
Hoodoo Creek	2.4	20	21	17	60%

[a] Big Cedar Creek and Lower Clear Creek Face watersheds were not assigned fish/water quality objectives or sediment yield guidelines, primarily because most of the area is on private lands.

At the levels planned, harvest and burning activities would be considered an entry when compared to the Forest Plan standard. With no activities qualifying as entries in 9 of the prescription watersheds in the last decade, all alternatives are within Forest Plan Appendix A guidelines for sediment yield. For Pine Knob Creek, an entry was made in 2005 for the Middle Fork timber sale. This watershed is allowed 2 entries per decade, so it also meets the Forest Plan guideline.

Implementation of project design measures, adherence to BMPs, and maintenance of PACFISH buffers would reduce potential erosion and further limit the risk of sediment reaching streams. Any sediment yield increases would be short-term (0–6 years), and beneficial uses in Clear Creek and the Middle Fork Clearwater River would be maintained.

Prescribed Burning

Low- and mixed-severity prescribed fire is proposed on 1,370 acres in 15 units (701 – 715) for all action alternatives. This activity is assessed using ECA and the NEZSED model.

Precommercial Thinning

Although precommercial thinning would cause some opening of the canopy, ECA would not increase; therefore, water yield would not increase either. Ground vegetation would be left undisturbed. Thinning would be completed with chainsaws, so no ground-disturbing activities would take place; therefore, neither soil erosion nor sediment input to streams would increase.

Temporary Road Construction

Approximately 36 miles of temporary roads would be constructed to access harvest units for Alternatives B and C, 8.7 miles of which occur on existing templates. Alternative D proposes 17.5 miles of temporary roads, including 8.7 miles located on existing templates. Temporary roads generate the most erosion when they are first constructed, and lesser erosion would occur during the 1–2 years the proposed roads would be open. Erosion would stabilize 2 years after decommissioning occurs. Temporary roads were included in the ECA and NEZSED analyses. Increase in ECA from temporary road construction is <1% for all watersheds. Increase in peak flow from this activity is unlikely.

The erosion potential from temporary roads would be short-term (0–5 years), since the roads would be built, used, and decommissioned over a period of 1–3 years and located on low-gradient, dry ridges or upper slopes, away from water, with no stream crossings.

Project design measures for temporary roads would minimize the erosion produced over the short life of these roads. For example, temporary roads would be closed to public motorized use during project activities, reducing the chance of increased erosion from vehicles driving on wet roads and rutted surfaces.

Road Maintenance and Reconstruction

Approximately 120 miles of roadwork is proposed and would include spot surface gravel placement and possible culvert repairs, replacements, or additional installations to improve drainage. Road maintenance and improvements are considered a beneficial effect to water quality (Burroughs 1990; Grace and Clinton 2006; Switalski et al. 2004; Swift and Burns 1999). Surface graveling has been shown to be effective at reducing erosion from road surfaces, especially at road/stream crossings. Studies have found gravel reduces sediment by 70%–79% (Burroughs and King 1989). Although this activity is designed to reduce sediment input over the long term, a minor increase in sediment is expected to occur in the short term (1 year).

Road Decommissioning

Road erosion and sediment yield usually decline over time but continue at a chronic level indefinitely (USDA 1981). Approximately 13.2 miles of road are proposed for decommissioning with this project. Road removal would reduce road density (Table 3-38) and provide an improvement in the overall watershed condition. However, even with the

proposed road decommissioning, the current (existing) watershed condition ratings would remain the same for each of the watersheds. For Big Cedar Creek, road miles on the Forest Service portion of the watershed were reduced by 20%. Road miles on LSP areas were reduced by 15%.

At the 6th field HUC level, road density in Upper Clear Creek went from 3.1 mi/mi^2 (high/poor condition) to 2.8 mi/mi^2 (moderate condition). In Lower Clear Creek, road density went from 3.0 mi/mi^2 to 2.9 mi/mi^2. South Fork Clear Creek road density remained moderate at 1.8 mi/mi^2.

Table 3-38. Estimated reduction in road density from Clear Creek project activities

Forest Plan Prescription Watershed	Road Density Before EA[a] (2011)	Existing Road Density[b] (miles/miles^2)	Proposed road decommissioning (miles)	Road density after Clear Creek activities[b]
Pine Knob Creek	4.8	4.8	1.81	4.3
Browns Spring Creek	4.1	4.1	4.52	3.2
Clear Creek	2.3	2.3	0.52	2.3
Solo Creek	3.5	3.5	1.34	3.1
Middle Fork Clear Creek	2.4	2.4	1.29	2.2
Kay Creek	2.6	2.5	0.94	2.4
South Fork Clear Creek	1.6	1.6	0	1.6
Hoodoo Creek	4.6	3.8	0.78	3.8
Big Cedar Creek	4.6	4.6	1.72	4.4
Lower Clear Creek Face	1.8	1.8	0	1.8

[a] South Fork/West Fork Clear Creek Road Decommissioning 2011 decision.
[b] Includes private and Forest Service roads

Road decommissioning activities would benefit water resources by reducing flow energy on roadbeds and within ditches, while reducing road-related sediment. The proposed road decommissioning projects include the removal of culverts, which would improve stream bank stability, width-to-depth ratio, and floodplain connectivity at localized sites.

Some short-term sediment delivery is expected in the smaller tributaries that bisect the decommissioned roads. Sediment would be delivered during project implementation and during the stream channel stabilization period of 2–3 years. Road decommissioning activities would produce some short-term sediment, both temporally and spatially (Foltz et al. 2007). Past monitoring of obliteration showed only minor amounts of sediment delivered to headwater streams, mostly in the form of suspended sediment, as indicated by increases in turbidity.

Design criteria and BMPs would be applied to each of these activities to minimize increases of sediment delivery to stream channels. Road decommissioning may produce short-term (0–3 years) and localized sediment increases, but it would produce both immediate and long-term recovery benefits.

Water Temperature

The Clear Creek project is not expected to increase stream water temperatures, due to implementation of PACFISH buffers (see "Aquatics" section).

Floodplains and Wetlands

No activities, other than roadwork, are proposed in floodplains or wetlands. PACFISH buffers would be implemented along streams and seeps/springs in the commercial and precommercial thin units. The protection of health, safety, and welfare, the prevention of loss of property values, and the maintenance of natural systems would be retained under all of the action alternatives.

3.8.7 Cumulative Effects

Cumulative effects arise when the incremental impact of an action is added to impacts from past, present, and reasonably foreseeable actions. Past harvest activities and associated road construction have had the most impact, with increases in water yield and sediment yield in the Clear Creek drainage and its tributaries.

The cumulative effects area is the Clear Creek watershed (5th field HUC), which encompasses the entire Clear Creek project area.

The temporal scope for watershed effects extends from the 1950s to 2037. The beginning date is based on the time frame of the first harvest and road construction activities in the watershed. Evidence from those events is still noticeable on the landscape in the form of old skid trails and landings and the current road system. The scope continues to year 2037, which is approximately 24 years after project implementation, the estimated amount of time required for ECA levels from this project to be no longer perceptible.

3.8.7.1 Past, Present, and Reasonably Foreseeable Actions

Several timber sales have occurred in the 3 subwatersheds evaluated in this analysis (see project file and ECA analysis). Timber sales conducted between the early 1950s and late 1990s involved many miles of new road construction, little to no tree retention in regeneration harvest areas, and dozer piling of slash. These activities resulted in widespread and persistent impacts on the subwatersheds and caused increased sedimentation and increased water yields. The Forest Service owns 72% of the Clear Creek watershed, and past harvest activities have occurred on approximately 28% of that Forest Service land.

Forest practices have changed over the last few decades. Project design measures, BMPs, and Forest Plan guidelines have been developed in order to reduce ground-disturbing activities and subsequent sediment delivery. Operating under dry conditions, implementing PACFISH buffers, retaining trees in regeneration harvest units, and limiting ground-based yarding to slopes <35% have become common practices.

Over 30 miles of Forest Service system roads have been decommissioned in the Clear Creek watershed since 1996. This activity produced localized short-term sediment during implementation but created long-term sediment reductions and benefits to overall channel conditions.

Present actions include permitted grazing, recreation, fire suppression, road maintenance, and control of noxious weeds using chemical, mechanical, and biological methods. Recreational activities produce little to no impact to water quality or quantity or to floodplain/wetland functions. Most effects from recreation are primarily due to associated road use, especially during wet conditions. Effects from grazing include stream bank instability and reduced water infiltration rates in areas with soil compaction (localized areas). Fire suppression activities are infrequent and limited in size, and road maintenance has minimal short-term effects and long-term benefits (Burroughs and King 1989).

The following foreseeable future or concurrent actions may occur in the Clear Creek watershed:

- Browns Spring culvert replacements (decision 2012): This activity involves the replacement and upsizing of 2 culverts in the Upper Clear Creek subwatershed.
- Eastside Allotment project (decision 2013): This project includes an adaptive management plan to improve pasture and water quality conditions while keeping livestock numbers the same.
- Clear Ridge Road Decommissioning (decision 2012): This project proposes 65 miles of nonsystem roads for decommissioning, which will improve water infiltration and reduce soil erosion potential.
- Harvest of state of Idaho lands: The Bruin Storm project would seedtree harvest approximately 160 acres in the Lower Clear Creek subwatershed in the next 5 years.
- Private land harvest: This project includes undetermined amount and prescription of harvest of private lands in the Crane Hill area (Upper Clear Creek subwatershed) in the next 5 years.

The first 3 projects are considered watershed improvement projects and will help to improve water quality and quantity. Any increases in erosion and subsequent sediment yield would be short-term and in isolated locations.

The last 2 projects are harvest activities that could increase ECA and soil erosion. The small amount of acreage involved would increase ECA by <1% in the Clear Creek watershed. These projects would follow water and soil quality protection practices regulated through the Idaho Forest Practices Act.

3.8.7.2 Alternative A—No Action

Cumulative effects arise when the incremental impact of an action is added to impacts from past, present, and reasonably foreseeable actions. Alternative A would create no direct or indirect effects; therefore, no cumulative effects to water yield or sediment yield would occur under this alternative.

3.8.7.3 Alternatives B, C, and D—Action Alternatives

3.8.7.3.1 Water Yield

Even though NFS lands comprise 72% of the Clear Creek watershed, they contribute 84% of the average annual flow of Clear Creek. Percent increase in ECA is used as an indicator of change in water yield resulting from reductions in forest canopy. Vegetation removal

activities include prescribed burning, regeneration harvest, improvement harvest, commercial thinning (but not precommercial thinning), and construction of temporary roads. A lower ECA indicates a higher (better) watershed condition. ECAs of <15% indicate high (good) condition (NOAA 1998).

The estimated existing ECA for the Clear Creek watershed is 4% and includes past activities on Forest Service, state, and private lands. Estimated increases in ECA from the Clear Creek project are 10% for Alternatives B and C and 9% for Alternative D. When these increases are added to the existing ECAs, they produce ECA estimates that predict what watershed conditions will be like after the Clear Creek project. Final ECA estimates are 14% for Alternatives B and C and 13% for Alternative D. ECA estimates predict that watershed conditions would remain high (good) under all 3 action alternatives. Therefore, no stream channel alteration from increased water yield is expected from the Clear Creek project.

As shown in Figure 3-10, ECA would decrease to its pre-project level (4%) after 12 years for Alternatives B and D and after 15 years for Alternative C. ECA from Clear Creek activities would no longer be discernible after 24 years.

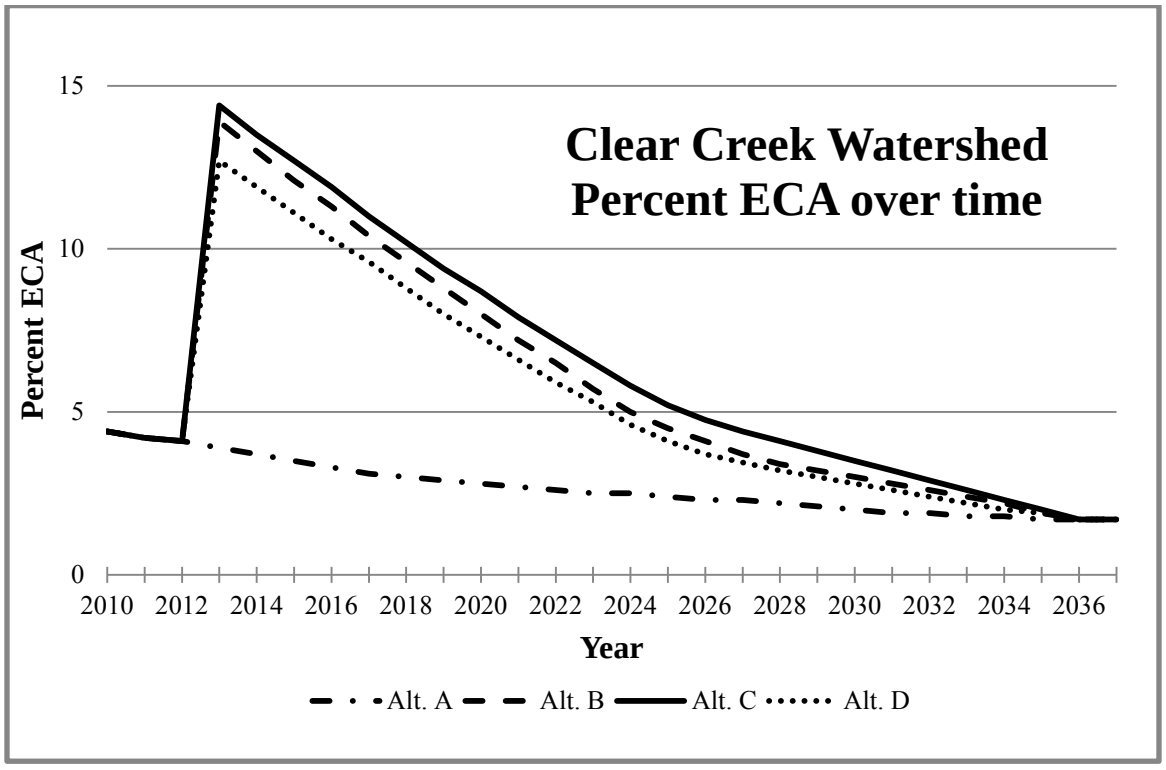

Figure 3-10. Percent Equivalent Clearcut Area (ECA) over time for Clear Creek watershed (5th field HUC)

New research indicates that water yield increases (and associated effects on streams) may not be as important as previously thought, especially in the context of contemporary forest management. The primary concern about changes in water yield is how they may directly or indirectly affect stream channels, aquatic habitat, and water quality. Numerous studies have documented the effects of forest canopy removal on water yield, but surprisingly, very few have demonstrated a direct link between water yield changes and channel impacts in a

forested environment. For example, Grant et al. (2008) conducted a comprehensive literature review and determined no field studies have made a direct link between peak flow increases and channel impacts. Schnakenberg and MacDonald (1998) found no correlation between ECA and stream channel characteristics in forested catchments in Colorado. MacDonald et al. (1995) studied the relationship between WATSED-predicted water yield/peak flow increases and channel characteristics on the Kootenai National Forest. None of the channel types (pool riffle or colluvial step-pool) showed any increase in bankfull width or width-to-depth ratio with more intensive management. However, correlations were found between management indices and sediment characteristics; these correlations suggest that sediment delivery is a more important consideration than water yield. Analysis of reference and managed streams on the Flathead National Forest suggests no relationship between bankfull width and the degree of management (Kendall 2011), a finding that is consistent with the results of MacDonald et al. (1995). Grant et al. (2008) concluded that the effects of peak flow increases are relatively minor in comparison to other anthropogenic changes to streams and watersheds. In general, channel impacts associated with peak flow increases alone are likely to be much less significant than other impacts associated with forest management activities. In general, management-induced increases in peak flow diminish with the percentage of watershed impacted and increasing recurrence interval. Management effects on peak flow events over a 6-year recurrence interval are highly speculative (Grant et al. 2008).

3.8.7.3.2 Sediment Yield

Although the NEZSED model did predict an increase in sediment yield, the increase was well below that allowable under Forest Plan Appendix A. In addition, road density in the Clear Creek watershed was reduced from 2.7 mi/mi^2 to 2.6 mi/mi^2.

Figure 3-11 shows the predicted sediment yield generated by the Clear Creek project and routed to the mouth of Clear Creek, for each alternative. This includes the existing sediment yield over base from past project activities, plus the additional sediment yield generated from the Clear Creek project.

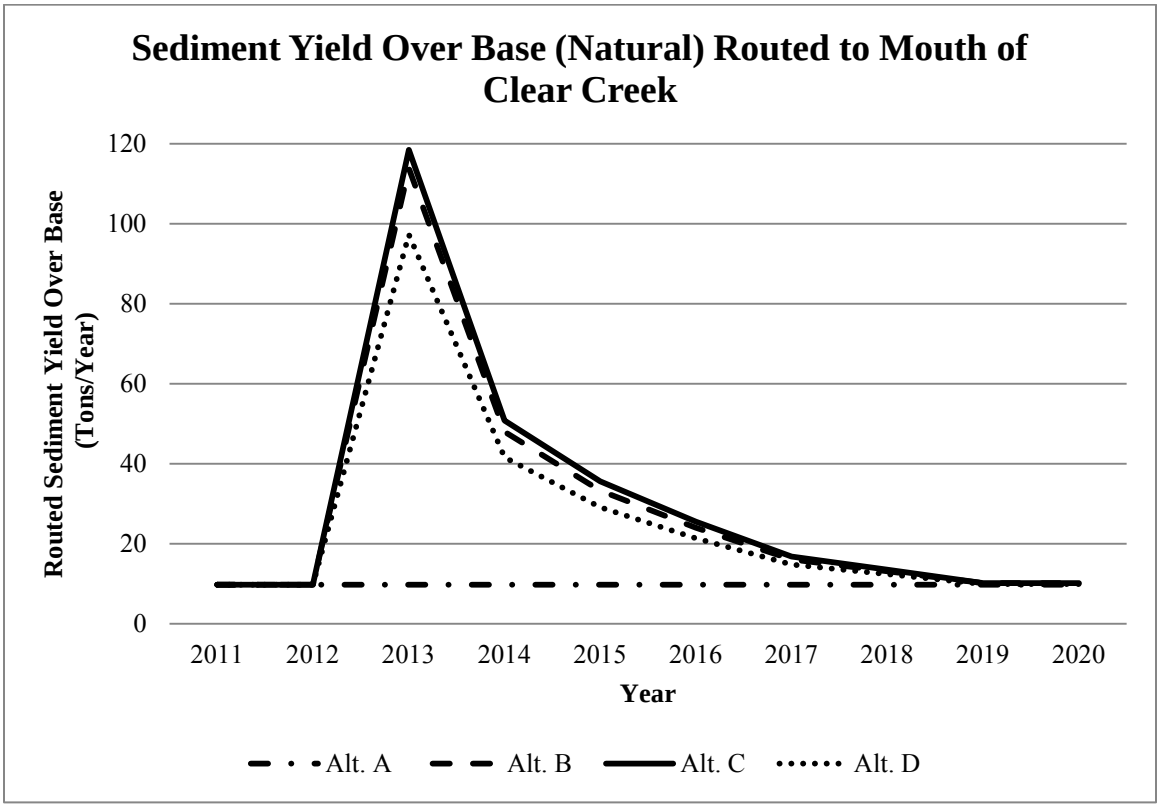

Figure 3-11. Sediment yield over base (natural) routed to mouth of Clear Creek

The total routed sediment yield would range from 10 to 118 tons per year, depending on alternative (Table 3-39). This number was added to the base (natural) sediment yield of Clear Creek (2,762 tons/year) to determine the combined effects to the watershed. This is the amount of routed sediment yield delivered to the mouth of Clear Creek for the peak activity year of 2013. This number does not include private land activities on the downstream portion of the Clear Creek watershed. For the year 2013, Alternative C produces the highest increase in sediment yield over base, at 118 tons/year. At this highest level, the amount of sediment yield is only 4% over base (natural). The differences in the total sediment yields produced by the action alternatives are relatively inconsequential (<1%).

Table 3-39. Tons of annual routed sediment yield over base (natural) to mouth of Clear Creek

Year	2011	2012	2013	Percent over base for Peak Activity Year 2013	2014	2015	2016	2017	2018	2019	2020
Alt. A	10	10	10	0%	10	10	10	10	10	10	10
Alt. B	10	10	114	4%	48	33	24	16	13	10	10
Alt. C	10	10	118	4%	51	36	26	17	13	10	10
Alt. D	10	10	97	3%	42	29	21	15	12	10	10

Implementation of project design measures, adherence to BMPs, and maintenance of PACFISH buffers would reduce potential erosion and further limit the risk of sediment reaching streams. Any sediment yield increases would be short-term (0–6 years), and beneficial uses in Clear Creek and the Middle Fork Clearwater River would be maintained.

Chapter 4–Consultation and Coordination

The Forest Service consulted the following individuals, federal, State, and local agencies, tribes and non-Forest Service persons during the development of this Draft Environmental Impact Statement:

4.1.1.1 Interdisciplinary Team Members

Matt Bienkowski,—Silviculture

Missy Dressen —Wildlife

Doug Graves—Fire/Fuels/Air Quality/Roadless

Clay Hayes—Idaho Department of Fish and Game

Lois Hill—Team Leader

Joe Hudson—District Ranger

Margaret Kirkeminde—GIS/Maps

Megan Lucas—Watershed/Soils

Steve Lucas—Heritage Resources

Lynelle Morelan—Roads

Karen Smith—Fisheries/Aquatics

Michael Ward—CFLRA Coordinator

John Warofka—Botany

Tam White—Logging Systems/Economics/Layout

4.1.1.2 Federal, State, and Local Agencies

City of Cottonwood, Idaho

Idaho County Sheriff

Idaho Department of Environmental Quality

Idaho Department of Fish and Game

Idaho Department of Lands

Idaho State Historic Preservation Office

Kamiah Chamber of Commerce, Kamiah, Idaho

National Marine Fisheries Service

National Oceanic and Atmospheric Administration

National Resource Conservation Service

U.S. Fish and Wildlife Service

4.1.1.3 Tribes

Nez Perce Tribe

4.1.1.4 Others

Alliance for the Wild Rockies

The Clearwater Basin Collaborative

The Friends of the Clearwater

The Nature Conservancy

Glossary and Acronyms

A

Activity	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and range land outputs or achieve administrative or environmental quality objectives.
Affected Environment	The biological and physical environment that will or may be changed by actions proposed and the relationship of people to that environment.
AIRFA	American Indian Religious Freedom Act of 1978.
Alternative	One of several policies, plans, or projects proposed for decisionmaking.
Anadromous Fish	Fish which spend much of their adult life in the ocean, returning to inland waters to spawn; eg., salmon, steelhead.
Aquatic Ecosystem	A stream channel, lake, or estuary bed, the water itself, and the biotic communities that occur therein.
ATV	All-Terrain Vehicle. A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

B

Best Management Practices, BMP, BMPs	The set of standards in the Forest Plan which, when applied during implementation of a project, ensures that water related beneficial uses are protected and that State water quality standards are met. BMPs can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the States. Others are defined by the Forest interdisciplinary planning team for application Forestwide. Both of these kinds of BMPs are included in the Forest Plan as forestwide standards. A third kind is identified by the interdisciplinary team for application to specific management areas. A fourth kind, project level BMPs, is based on site specific evaluation, and represents the most effective and practicable means of accomplishing the water quality and other goals of the specific evaluation, and represents the most effective and practicable means of accomplishing the water quality and other goals of the specific area involved in the project. These project level BMPs can either supplement or replace the Forest Plan standards for specific projects.
Big Game	Those species of large mammals normally managed as a sport hunting resource.
Big Game Summer Range	Land used by big game during the summer months.
Big Game Winter Range	The area available to and used by big game through the winter season.
Biological Evaluation	An assessment required by the Endangered Species Act of 1973 to identify any threatened, endangered, or sensitive species which is likely to be affected by a proposed management action, and to evaluate the potential effects of the proposed action on the species or their habitats.
Biological Potential	The maximum possible output of a given resource, limited only by its inherent physical and biological characteristics.
BLM	Bureau of Land Management
BO	Biological Opinion
Browse	Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

C

Capability	The potential of an area of land and/or water to produce resources, supply goods and services, and allow resource uses under a specified set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, practices such as silviculture, or protection from fires, insects, and disease.
Cavity	A hollow in a tree which is used by birds or mammals for roosting and reproduction.
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Channel Morphology	The study of the channel pattern and the channel geometry at several points along a river channel, including the network of tributaries within the drainage basin. Also known as fluviomorphology; stream morphology.
Channel Type	A system developed by hydrologist Dave Rosgen To classify and characterize similar stream channels. Water surface gradient and substrate particle size are the primary stream features used. Other features include bankfull width, width to depth ratio, entrenchment ratio, and floodprone width.
Closed Roads	Roads developed and operated for limited use. Public vehicular traffic is restricted except when they are operating under a permit or contract or in an emergency.
Closure	The administrative order that does not allow specified uses in designated areas or on Forest development roads or trails.
Commodities	Resources with commercial value; all resource products which are articles of commerce, such as timber, range, forage, and minerals.
Council on Environmental Quality, CEQ	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover	Vegetation used by wildlife for protection from predators, or to protect themselves from weather conditions, or in which to reproduce.
CRB	Columbia River Basin
Critical Habitat	Specific areas within the geographic area occupied by a species on which are found those physical and biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection. Critical habitat does not include the entire geographic area which may be occupied by a Threatened or Endangered species.
Cultural Resources	The physical remains of human activities, such as artifacts, ruins, burial mounds, petroglyphs, etc., and the conceptual content or context, such as a setting for legendary, historic, or prehistoric events as a sacred area of native peoples, etc., of an area.
Cumulative Effect	The impact on the environment which results from the incremental impact of the action when added to other actions. Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.
CWA	Clean Water Act
CWMA	Cooperative Weed Management Areas

D

DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
Desired Future Condition; DFC	Desired Future Condition; a desired condition of the land to be achieved sometime in the future.
Developed Recreation	Recreation that occurs where improvements enhance recreation opportunities and accommodate intensive recreation activities in a defined area.
Direct Effects	Effects on the environment which occur at the same time and place as the initial cause or action.

Dispersed Recreation	That portion of outdoor recreation use which occurs outside of developed sites in the unroaded and roaded Forest environment; i.e., hunting, backpacking, and berry picking.
Disturbance	Any management activity that has the potential to accelerate erosion or mass movement; also any other activity that may tend to disrupt the normal movement or habits of a particular wildlife species. At the landscape scale, a disturbance would be a force, such as wildfire, disease, or large scale vegetation management, which can significantly alter existing ecosystem conditions.
Diversity	The distribution and abundance of different plant and animal communities and species within an area.
Draft Environmental Impact Statement; Draft EIS; DEIS	Draft Environmental Impact Statement. A detailed written statement as required by Section 102(2)(C) of the National Environmental Policy Act.
DRAMVU	Designated Routes and Areas for Motor Vehicle Use
DSD	Detrimental Soil Disturbance

E

EAU	Elk Analysis Unit
Economic Efficiency	The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit cost ratios and rates of return may sometimes be appropriate.
Ecosystem	A complete, interacting system of organisms considered together with their environment; a marsh, watershed, or lake, for example.
Effects (or Impacts)	Physical, biological, social, and economic results (expected or experienced) resulting from natural events or management activities. Effects can be direct, indirect, and/or cumulative.
EHE	Elk Habitat Effectiveness
Endemic	Term applied to populations of potentially injurious plants, animals, or viruses that are at their normal, balanced, level, in an ecosystem in contrast to epidemic levels. Plant and animal diseases which are prevalent in or peculiar to a certain locality.

Elk Hiding Cover	Vegetation, primarily trees, capable of hiding 90 percent of an elk seen from a distance of 200 feet or less.
Elk Security Area	An area elk retreat to for safety when disturbance in their usual range is intensified, such as by logging activities or during the hunting season. To qualify as a security area, there must be at least 250 contiguous acres that are more than 1/2 mile from open roads.
Endangered Species	Any species which is in danger of extinction throughout all or a significant portion of its range, and listed as such by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.
Energy Limited Streams	An energy limited stream is generally a low energy, meandering type system with a large source of sediment in the bed and banks. They tend to be more sensitive than supply limited systems to excess sediment deposition. They recovery slowly if at all from sediment depositing events.
Environment	The aggregate of physical, biological, economic, and social factors affecting organisms in an area.
Environmental Analysis	An analysis of alternative actions and their predictable short and long term environmental effects which include physical, biological, economic, social, and environmental design factors and their interactions.
Environmental Assessment; EA	A concise public document for which a Federal agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact; (2) aid an agency's compliance with the National Environmental policy Act when no Environmental Impact Statement is necessary; and 93) facilitate preparation of an environmental impact statement when one is necessary.
Environmental Impact Statement; EIS	A concise public document for which a Federal agency is responsible that serves to (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary; and (3) facilitate preparation of an environmental impact statement when one is necessary. Also see DEIS, FEIS.
EO	Executive Order

Ephemeral	A depression in the topography that carries surface water during peak rainfall events.
Epidemic	Plant and animal diseases which rapidly build up to highly abnormal and generally injurious levels.
Erosion	The wearing away of the lands's surface by water, wind, ice, or other physical processes. It includes detachment, transport, and deposition of soil or rock fragments.
ESA	Endangered Species Act
Essential Habitat	Areas with essentially the same characteristics as critical habitat but not declared as such. These habitats are necessary to meet recovery objectives for endangered, threatened, and proposed species.

F

Final Environmental Impact Statement; Final EIS; FEIS	Final Environmental Impact Statement. The final version of the public document required by the National Environmental Policy Act (see Draft Environmental Impact Statement).
Floodplain	Low land and relatively flat areas joining streams, rivers, and lakes which are periodically inundated by overbank flows of water.
Forage	All browse and nonwoody plants available to livestock or wildlife for feed.
Forest Plan	Nez Perce National Forest Land and Resource Management Plan, September, 1987.
Forest and Rangeland Renewable Resources Planning Act of 1974	An act of Congress which requires the assessment of the nation's renewable resources and the periodic development of a national renewable resources program. It also requires the development, maintenance and, as appropriate, revision of land and resource management plans for National Forests.
Forest Type	A classification of forest land based on the live tree species present.
FP	Forest Plan
FR	Federal Register

FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
Fuels	Includes both living plants and dead, woody vegetation that are capable of burning.
Fuels Management	Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.
FWS, USFWS	Fish and Wildlife Service

G

Geographic Information System; GIS	Geographic Information System. A computer program for manipulating landscape configuration data.
Geomorphic Threshold	The percent increase of sediment over normal or natural conditions which may result in unstable channel conditions in a stream system.

H

Habitat	A place where a plant or animal naturally or normally lives and grows.
Habitat Effectiveness	The measure of how open roads affect utilization of habitat by elk.
Habitat Type	An aggregation of all land areas potentially capable of producing similar plant communities at climax.
Hiding Cover	Trees of sufficient size and density to conceal animals from view at 200 feet. See Cover.
HUC	Hydrologic Unit Code
Hydrologic Recovery	The process of revegetation of a disturbed area which returns the site to predisturbance levels of water runoff and timing of flow.

I

ICBEMP	Interior Columbia Basin Ecosystem Management Project
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
Indicator Species	Species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important. See Management Indicator Species.
Indigenous	Having originated in and being produced, growing, living, or occurring naturally in a particular region or environment.
Indirect Effects	Indirect effects are caused by the action and occur later in time or further removed in distance, but are still reasonably foreseeable.
INFISH	Inland Native Fish Strategy (July 28, 1995)
INFRA	Infrastructure Database (the database of record for Forest Service roads and trails)
Interdisciplinary Team; ID Team; IDT	Interdisciplinary Team. A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view to bear on the problem.
Invasive Species	Any non-native plant, such as spotted knapweed or yellow star thistle, which when established may become destructive and difficult to control by ordinary means of cultivation or other control practices.

Inventory Data	Recorded measurements, facts, evidence, or observations of forest resources such as soil, water, timber, wildlife, range, geology, minerals, and recreation, which is used to determine the capability and opportunity of the forest to be managed for those resources.
IPM	Integrated Pest Management
IRA	Inventoried Roadless Area
Irretrievable	Foregone or lost production, harvest, or use of renewable natural resources. For example, when fire destroys a tree plantation, the effect is irretrievable but the loss of site productivity as measured by the presence of trees is not irreversible.
Irreversible	The removal of resources such that they cannot be produced gain. This applies most commonly to nonrenewable resources such as minerals or cultural resources, or to resources such as soil productivity that are renewable only over long periods of time. Loss of renewable resources can also be irreversible as in the replacement of a forest with a road.
Issue	A subject or question of widespread public discussion or interest regarding management of National Forest System lands.

K

Key Wildlife Habitat Components	Areas or features of the forest which are of particular importance for maintaining overall wildlife habitat. These areas and features include moist areas, wallows, meadows, parks, critical hiding cover, thermal cover, migration routes, and staging areas.

L

Land Allocation	The assignment of a management emphasis to particular land areas to achieve the goals of the issues, concerns, and opportunities identified during the planning process.

Landtype; Landtype Association; LTA	Landtype Association. An area of land classified on the basis of geomorphic attributes. An understanding of geologic processes, as reflected in land surface form and features, individual kinds of soil, and the factors which determine the behavior of ecosystems (i.e., climate, vegetation, relief, parent materials, and time) is used as the basis for this classification system.
LAU	Lynx Analysis Unit

M

MA	Management Area
MA 1	Provide the minimum management necessary to provide for resource protection and to ensure public safety. Additional road construction will be allowed to manage adjacent areas.
MA 2	Provide and maintain sites for facilities necessary for the administration of Nez Perce National Forest lands.
MA 3	Manage to ensure that prehistorical, historical, archaeological, and/or paleontological sites are studied, preserved, or protected.
MA 4	Encourage valid exploration and development of mineral resources while minimizing surface impacts from mineral activities.
MA 6	Manage areas for nonmanipulative research, observation, and study of undisturbed ecosystems.
MA 7	Manage for developed recreation opportunities, providing interpretation and enhancement of cultural and natural resources. Maintain or enhance existing developed recreation sites.
MA 8.1, 8.2, 8.3	Manage for outstandingly remarkable values and free-flowing river conditions as specified in the Wild and Scenic Rivers Act of 1968, as amended.
MA 9.1, 9.2, 9.3	Manage the wilderness values as specified by the Wilderness Preservation Act of 1964.
MA 10	Manage to protect or enhance riparian-dependent resources.
MA 11	Manage for high fishery/water quality objectives, wildlife security, and high quality dispersed recreation with no additional roads.

MA 12	Manage for timber production and other multiple uses on a sustained yield basis.
MA 13	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention on those areas of medium to high visual sensitivity. This management area consists of intermingled acreages of lands similar to those found in management areas 12 and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 14	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention and improving the quality of winter range habitat for deer and elk. This management area consists of intermingled acreages of lands similar to those found in management areas 12, 16, and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas..
MA 15	Manage for timber production and other multiple uses on a sustained yield basis while improving the quality of deer and elk winter range. This management area consists of intermingled acreages of lands similar to those found in management areas 12 and 16. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 16	Manage to increase usable forage for elk and deer on potential winter range.
MA 17	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention.
MA 18	Manage to improve the quality of winter range habitat for deer and elk through timber harvesting or prescribed burning while meeting visual quality objectives of retention or partial retention on appropriate areas. This management area consists of intermingled acreages of lands similar to those found in management areas 16 and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 19	Manage for livestock forage production and other multiple uses on a sustained yield basis.
MA 20	Manage for old-growth habitat for dependent species.

MA 21	Manage grand fir-Pacific yew communities for moose winter range and other multiple uses.
MA 22, 23	Manage to ensure that the Idaho water quality standards for community public supply water uses are met.
Management Area	An aggregation of capability areas which have common management direction and may be noncontiguous in the forest. Consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.
Management Practice	A technique or procedure commonly applied to forest resources, resulting in measurable outputs or activities.
Management Prescription	Management practices and intensities selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.
Mine	A mining claim on which the claimant has gained title to all property rights; the land is no longer public domain, and is private property.
Mining Claims	A geographic area of the public lands held under the general mining laws in which the right of exclusive possession is vested in the locator of a valuable mineral deposit. Includes lode claims, placer claims, mill sites and tunnel sites.
Mitigation	Avoiding or minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.
Management Direction	A statement of multiple use and other goals and objectives, the associated management prescriptions and the associated standards and guidelines for attaining them.
Management Indicator Species	A plant or animal which, by its presence in a certain location or situation, is believed to indicate the habitat conditions for many other species.
MIS	Management Indicator Species

Model	A theoretical projection in detail of a possible system of natural resource relationships. A simulation based on an empirical calculation to set potential or outputs of a proposed action or actions.
Monitoring	An examination, on a sample basis of Forest Plan management practices, to determine how well objectives have been met and a determination of the effects of those management practices on the land and environment.
MVUM	Motor Vehicle Use Map

N

NAGPRA	Native American Graves Protection and Repatriation Act of 1990
National Environmental Policy Act; NEPA Process	National Environmental Policy Act. An act to declare a national policy that will encourage productive and enjoyable harmony between man and his environment, to promote efforts that will prevent or eliminate damage to the environment and biosphere, and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality. An interdisciplinary process, mandated by the National Environmental Policy Act, which concentrates decisionmaking around issues, concerns, alternatives, and the affects of alternatives on the environment
National Forest Management Act	A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that require the preparation of Regional and Forest plans and the preparation of regulations to guide that development.
National Forest System	All National Forest lands reserved or withdrawn from the public domains of the United States; all National Forest lands acquired through purchase, exchange, donation, or other means; the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as part of the system.

National Recreation Trails	Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by the National Trails System Act. National recreation trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas.
National Register of Historic Places	A listing maintained by the National Park Service of areas which have been designated as being of historical value. The Register includes place of local and State significance as well as those of value to the nation as a whole.
Natural Sediment Production	The amount of sediment produced in a watershed prior to any management activities such as roads or harvest. Natural, or baseline, sediment is a function of parent material, soil type, degree of weathering, glacial influences, etc.
NEPA	National Environmental Policy Act
NEZSED	A computer model that analyzes and predicts effects of activities on water quality and quantity.
NF	NF National Forest
NFMA	National Forest Management Act
NFS	National Forest system
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
No Action Alternative	An alternative where no management activities would occur beyond those currently under way. The development of a No Action Alternative is requested by regulations implementing the National Environmental Policy Act (40 CFR 1502.14). The No Action Alternative provides a baseline for estimating the effects of other alternatives.
NOAA	National Oceanic and Atmospheric Administration
NPT	Nez Perce Tribe
NRLMD	Northern Rockies Lynx Management Direction

O

Objective	A specified statement of measurable results to be achieved within a stated time period. Objectives reflect alternative mixes of all outputs of achievements which can be attained at a given budget level. Objectives may be expressed as a range of outputs.
Off-Highway Vehicle; OHV	Off Highway Vehicle. Vehicles such as four and three wheelers, motorcycles, and bicycles which are designed to operate on primitive roads and trails, or to navigate cross country where there are no constructed travelways.
ORV	Off-Road Vehicle. Please see "Off-Highway Vehicle."

P

PACFISH	The Decision Notice/Decision Record, Finding of No Significant Impact, and Environmental Assessment for the interim strategies for managing anadromous fish producing watersheds in eastern Oregon and Washington, Idaho, and portions of California. Published by the USDA Forest Service and USDI Bureau of Land Management in 1995.
Patented Mining Claim	A patent is a document which conveys title to land. When patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Mining Law or implementing regulations.
Perennial Stream	A stream which normally flows throughout the year.
PILT	Payment in Lieu of Taxes
PL	Public Law
Preferred Alternative	The agency's preferred alternative, one or more, that is identified in the impact statement.
Prescription	Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.
Productivity	See Site Productivity

Proposed Action	In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency intends to implement or undertake and which is the subject of an environmental analysis.
Public Access	Usually refers to a road or trail route over which a public agency claims a right-of-way available for public use.
Public Involvement	A Forest Service process designed to broaden the information based upon which agency decisions are made by (1) informing the public about Forest Service activities, plans, and decisions, and (2) encouraging public understanding about and participation in the planning processes which lead to final decision making.
Public Issue	A subject or question of widespread public interest relating to management of the National Forest System.

R

Range Allotment	A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.
Ranger District	Administrative subdivision of the Forest supervised by a District Ranger.
RARE II	Roadless Area Review and Evaluation
Record of Decision	A document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible official's decision about an alternative assessed in the environmental impact statement chosen for implementation.
Recreation Opportunity Spectrum	The framework for stratifying and defining classes of outdoor recreation environments, activities, and experiences which are arranged along a continuum or spectrum that is divided into seven classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded modified, roaded natural, rural, and urban.

Recreation Visitor Day	Recreational use of National Forest developed sites or general forest areas which equals 12 visitor hours. A Recreation Visitor Day (RVD) may consist of 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of continuous or intermittent recreation use by individuals or groups. 1 person in a campground for 24 hours equals 2 RVD's.
Regional Guide	A document developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and established management standards and guidelines for National Forest System lands of a given Region to the national forest within a given Region. It also disaggregates the RPA objectives assigned to the Region to the Forests within that Region.
Revegetation	The reestablishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of man; eg., reforestation, range reseeding.
Right-Of-Way	Land authorized to be used or occupied for the construction operation, maintenance, and termination of a project facility passing over, upon, under, or through such land.
Riparian Areas	Areas with distinctive resource values and characteristics that are comprised of aquatic and riparian ecosystems, 100-year floodplains and wetlands. They also include all upland areas within a horizontal distance of approximately 100 feet from the edge of perennial streams or other perennial water bodies.
RMO	Resource Management Objective
ROS	Recreation Opportunity Spectrum
ROW	Right-of-Way
RNA	Research Natural Area
Road Management	The combination of both traffic and maintenance management operations. Traffic management is the continuous process of analyzing, controlling, and regulating uses to accomplish National Forest objectives. Maintenance management is the perpetuation of the transportation facility to serve intended management objectives.

Roadless Area	An area of National Forest which (1) is larger than 5,000 acres or, if smaller, is contiguous to a designated wilderness area or primitive area, 92) contains no roads, and (3) has been inventoried by the Forest Service for possible inclusion in the wilderness preservation system.
Roadless Area Review and Evaluation	A comprehensive process instituted in June 1977 to identify roadless and undeveloped land areas in the National Forest System and to develop alternatives for both wilderness and other resource management. The second roadless area review and evaluation was conducted on public lands in 1977. This inventory has been updated for this analysis to exclude any area affected by recent development and no longer considered roadless.
Rotation	The planned number of years between the formation of generation of trees and their harvest at a specified stage of maturity.
Rural	These areas are characterized by recreation sites that can be used by large numbers of people at one time.

S

SBW	Selway-Bitterroot Wilderness
Scoping	The procedures by which the Forest Service determines the extent of analysis necessary for a proposed action; i.e., the range of actions, alternatives and impacts to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.
Security Area	Any area which, because of its geography, topography, and/or vegetation, will hold elk during periods of stress. For this project, a security area is defined as a block of dense forested cover at least 250 acres in size and located at least 1/2 mile from any roads open to motorized traffic during the general hunting season.
Sediment	Any material, carried in suspension by water, which will ultimately settle to the bottom of streams.
Sediment Delivery Efficiency	A term describing how efficiently sediment is transported within a given portion of a stream.

Sediment Yield	The amount of material eroded from the land surface by runoff and delivered to a stream system.
Semi-Primitive Non-Motorized	There is a high quality of experiencing solitude, closeness to nature, tranquility, self-reliance, challenge, and risk.
Semi-Primitive Motorized	There is a moderate opportunity for solitude, tranquility, and closeness to nature.
Sensitive Species	Species (plants or animals) with special habitat needs that may be influenced by management programs.
SHPO	State Historic Preservation Officer
Site Productivity	The production capability of specific areas of land.
Skid Trails	A travelway through the woods formed by loggers dragging (skidding) logs from the stump to a log landing without dropped a blade and without purposefully changing the geometric configuration of the ground over which they travel.
Slash	The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning.
Snag	A standing dead tree used by birds for nesting, roosting, perching, courting, or foraging for food and by some mammals for escape cover, denning, and reproduction.
Snowmobile	Any self-propelled vehicle under one thousand pounds unladened gross weight, designed primarily for travel on snow or ice or over natural terrain, which may be steered by tracks, skis, or runners. Also see “over-snow vehicle.”
Soil Productivity	The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture and nutrients and length of growing season.
Stand	A plant community of trees which possess uniformity in vegetation type, age class, vigor, size class, and stocking class and one which is distinguishable from adjacent forest communities.
Standard	An objective requiring a specific level of attainment; a rule to measure against; a guiding principle.

Stream Order	A measure of the position of a perennial stream in the hierarchy of tributaries. First order streams are unbranched streams; they have no tributaries. Second order streams are formed by the confluence of two or more first order streams. Third order streams are formed by the confluence of two or more second order streams; they are considered third order until they join another third order or larger stream.
Subnivean	A zone that is in or under the snow layer. It can form when latent heat from the ground melts a thin layer of snow above it, leaving a layer of air between the ground and the snow. Subnivean animals include small mammals such as mice, voles, shrews, and lemmings that must rely on winter snow cover for survival. These mammals move under the snow for protection from heat loss and predators
Successional Stage	A phase in the gradual supplanting of one community of plants by another.
Suitable Forest Land	Forest land (as defined in CFR 219.13) for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity or watershed conditions; for which there is reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.14), and for which there is management direction that indicates that timber production is an appropriate use of that area.
Supply Limited Stream	A supply (sediment) limited stream has more energy available during a typical year than there is sediment in the stream channel available to be moved. The excess energy leads to a resilience that enables the system to recover and cleanse itself if extreme sediment loads are not delivered in a short period of time.
System Road; Forest System Road	A road that is part of the Forest development transportation system, which includes all existing and planned roads, as well as other special and terminal facilities designated as Forest development transportation facilities.

T

Temporary Roads	Roads which are constructed for a one time or short term use which are not expected to be utilized in the future. These roads will be obliterated after the need is past.
Terrestrial	Living or growing on land; not aquatic.

Thermal Cover	Cover used by animals to ameliorate effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure of 70 percent or more.
Threatened Species	Any species that is likely to become an endangered species within the foreseeable future throughout all of a significant portion of its range and one that has been designated as a threatened species in the Federal Register by the Secretary of the Interior.
Timber	A general term for the major woody growth of vegetation in a forest area.
Timber Base	The lands within the Forest that are suitable for timber production.
TMDL	Total Maximum Daily Load
Topography	The configuration of land surface including its relief, elevation, and the position of its natural and man-made figures.
Trailhead	The parking, signing, and other facilities available at terminus of a trail.
Turbidity	Sediment or foreign particles stirred up or suspended in water.

U

Understory	Vegetation (trees or shrubs) growing under the canopy formed by taller trees.
Unsuitable Timber Land	Lands not selected for timber production are Step II and Step III of the suitability analysis during the development of the Forest Plan due to (1) the multiple use objectives for the alternative preclude timber production, (2) other management objectives for the alternative limit timber production activities to the point where management requirements set for thin 36 CFR 219.27 cannot be met, and (3) the lands are not cost efficient over the planning production. Land not appropriate for timber production shall be designated as unsuitable in the Forest Plan.
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior

USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

V

Viewshed	A total landscape as seen from a particular viewpoint.
Visual Quality Objectives; VQOs	The degree of acceptable alteration of the characteristic landscape.
Visual Resource	The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

W

Wallow	A depression, pool of water, or wet area produced or utilized by elk or moose during the breeding season.
WATBAL	A computer model that analyzes and predicts effects of activities on water quality and quantity.
Watershed	The total area above a given point on a stream that contributes water to the flow at that point.
Wilderness Character	Wilderness character attributes are: Natural Integrity, Apparent Naturalness, Outstanding Opportunities for Solitude, and Opportunities for Primitive, Unconfined Recreation. These features were evaluated using capability analyses as conducted in 1978 using the Wilderness Attribute Rating (WAR) System and in 2005 using the Area Capability Assessment (ACA) Process. These analysis techniques rate wilderness character attributes as identified by the 1964 Wilderness Act.
WSRA	Wild and Scenic Rivers Act

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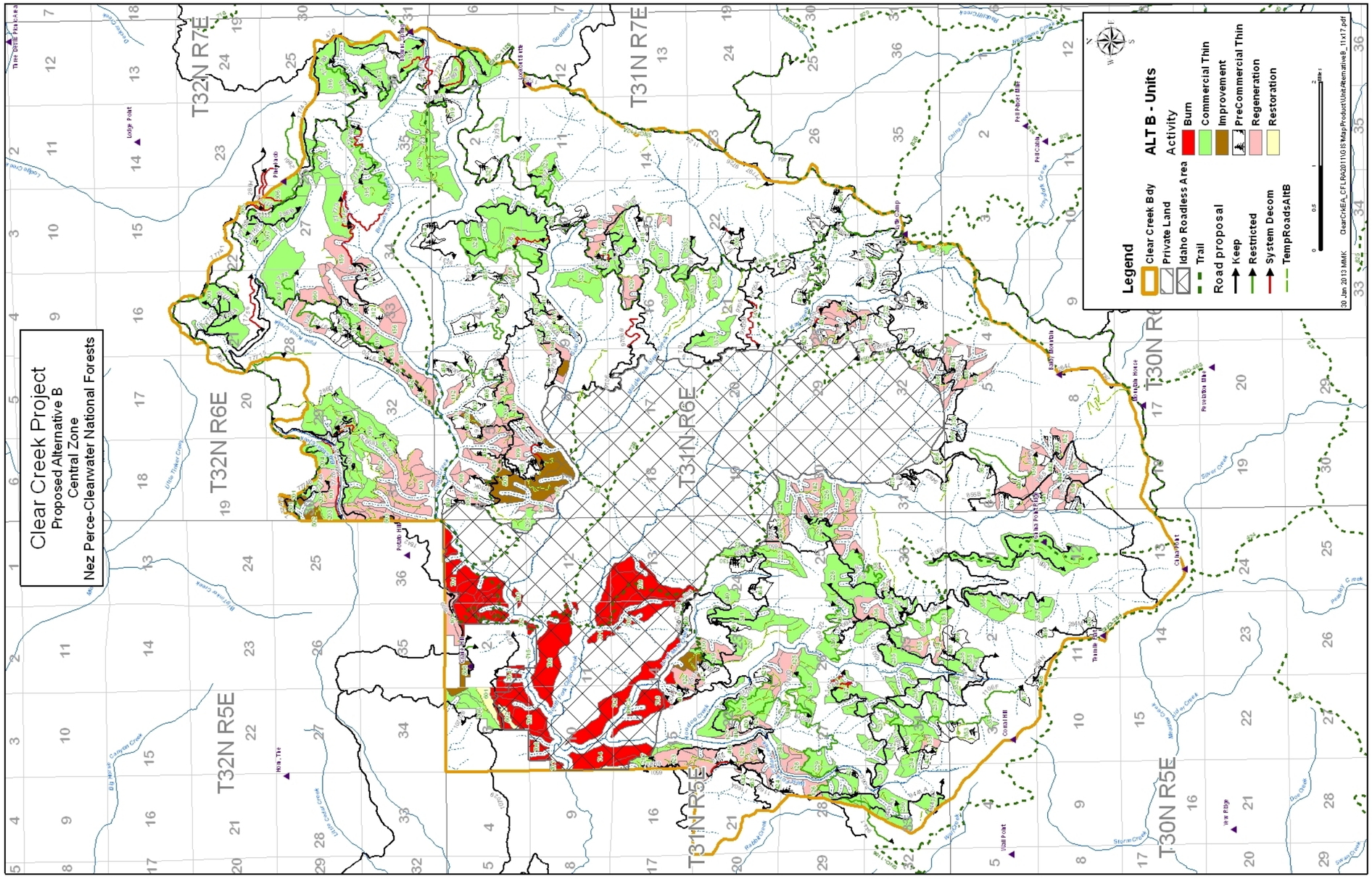
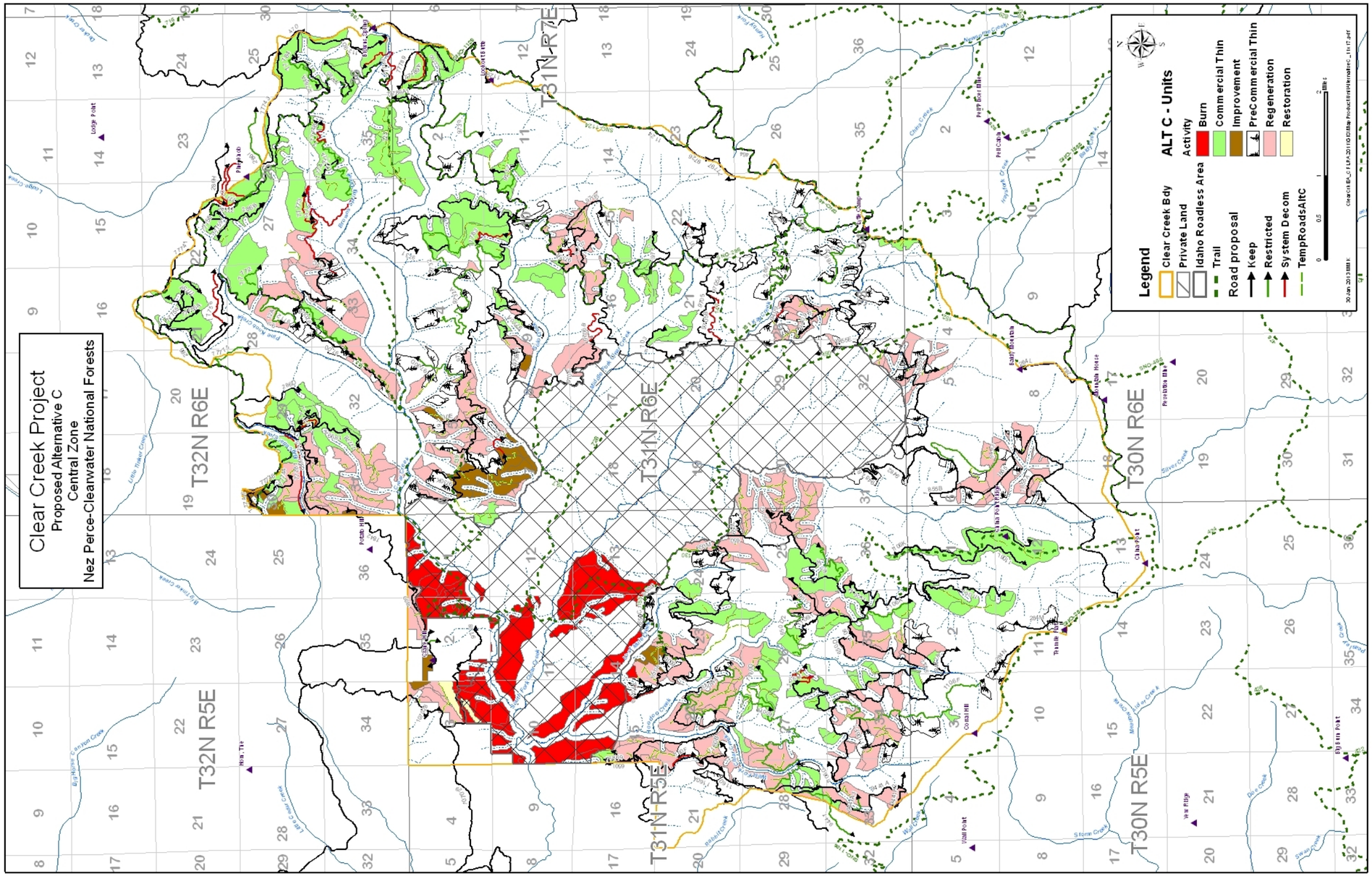
Appendix A
Maps

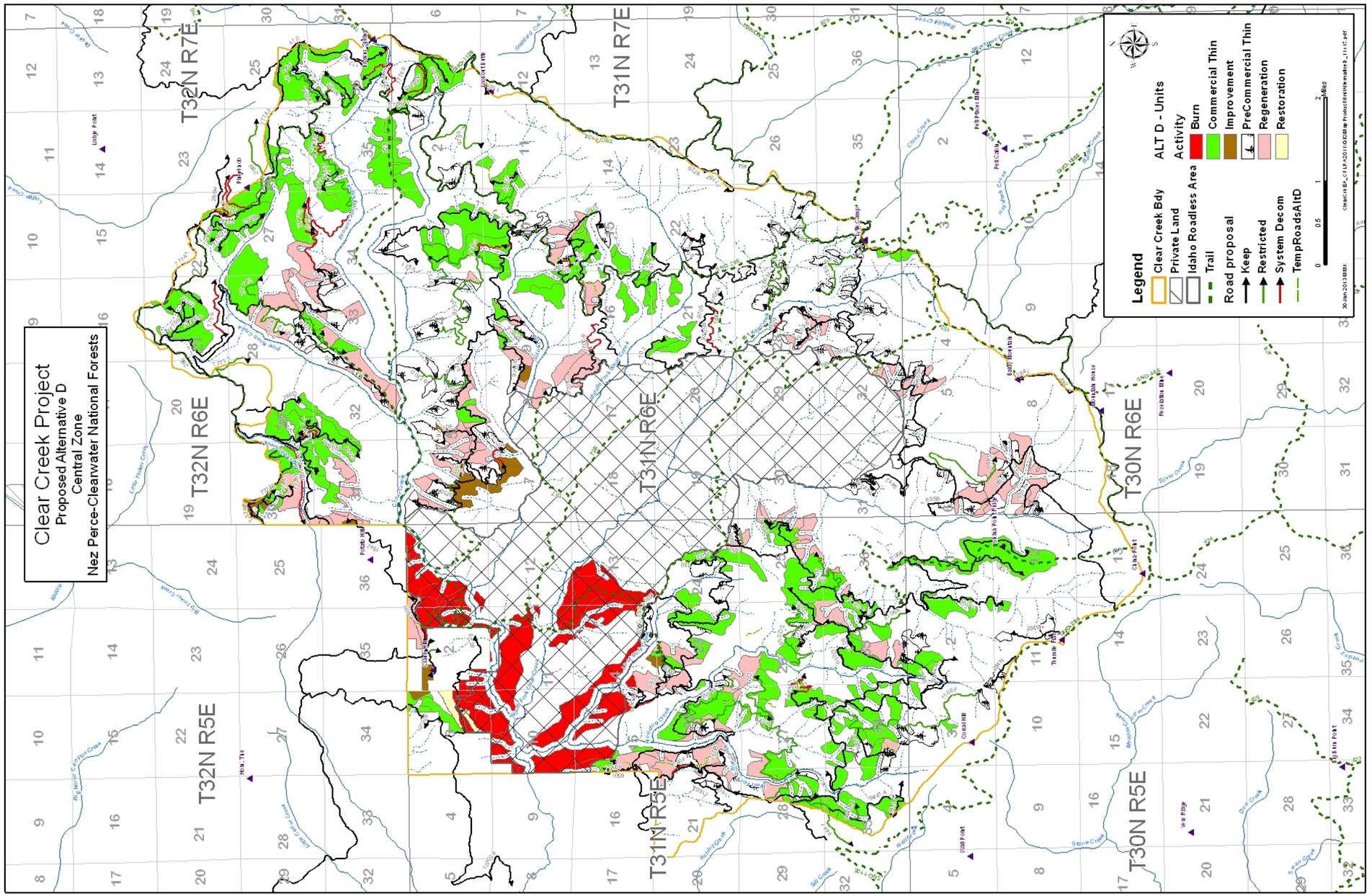
Map 1. Alternative B Units



Map 2. Alternative C Units



Map 3. Alternative D Units



Appendix B
Clear Creek Road Work

Road decommissioning practices vary depending on the road location and the risk of road failure. Roads that have moderate to high risk of failure, that are near fish bearing streams or are being used by unauthorized vehicles will require full decompaction and natural slope recontour. All roads with stream crossings or other watershed concerns will be recontoured including stream grade channel restoration. Roads identified in this project not meeting the above criteria may be abandoned. Abandoned roads have no stream crossings, are well vegetated, are resistant to surface erosion and are not prone to mass failure.

Each road used for timber haul in accordance with this project will be either reconditioned or reconstructed based on the existing condition of the roadway.

Reconditioning roads consists of standard maintenance, such as road blading, brushing, removal of small cutslope failures, applying rock in wet areas and removal of obstructions such as rocks and trees. Reconditioning also includes maintenance of existing culverts.

Road reconstruction improves the roadway. This includes replacing and installing new culverts for cross drains and live water culverts, placement of rock surfacing, placement of roadway fill and installation of new signs or gates. Other activities include installation of drainage dips, road blading, brushing and removal of obstructions.

The definitions for road reconstruction and road reconditioning above do not include all activities that can be completed under each classification; these definitions are for informational purposes only.

Reconditioning and reconstruction is based on the current condition of the roadway. As the project continues, road failures or different access may require the type of work and roads requiring work to change. This is an approximation of road work for the Clear Creek project.

Table 1 lists the road work for this project.

Table 1. List of road work for the Clear Creek Integrated Restoration Project

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
Decommission—13.2 Miles				
1106H	Stinking Water	0.78	Decommission end of road	Watershed
1114	Upper Clear Creek	1.70	Decommission from Junction 1114-C to Junction of the 77774	Watershed
1114C	Upper Clear Spur 2	0.17	Decommission end of road	Watershed
9705B	Kay Ridge South	0.94	Decommission	Watershed
9706B	Solo Ridge	0.78	Decommission	Watershed
9730J	Cougar Spur J	0.36	Decommission end of road after use in sale	Watershed
9734A	Upper Middle Fk Spur A	0.12	Decommission from ridge point to end of draw	Watershed
9735A	Upper Solo Spur A	0.23	Decommission after use in sale	Watershed
77742		0.32	Decommission	Watershed
77742A		0.57	Decommission	Watershed
77742B		0.11	Decommission	Watershed
77756		0.82	Decommission end of road	Watershed
77770		0.73	Decommission	Watershed
77773		0.86	Decommission	Watershed
77773A		0.11	Decommission	Watershed
77774B		0.46	Decommission	Watershed
77777A		0.30	Decommission	Watershed
77779		0.17	Decommission	Watershed
77780		0.15	Decommission	Watershed
77781		1.11	Decommission	Watershed
77783		0.66	Leave landing at beginning of road	Watershed
77786		0.12	Decommission end of road	Watershed
77789A		0.61	Decommission	Watershed
77799		1.00	Leave landing at beginning of road	Watershed

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
Recondition—48.8 Miles				
284	Elk City Wagon Road	5.00	Recondition	Sale Haul Route
284-M	Tenmile Cabin	0.72	Recondition	Sale Haul Route
284-N	Horse Corral	0.50	Recondition	Sale Haul Route
286-B	Lookout Tree Pit	0.20	Recondition	Sale Haul Route
286-H	Lonesome Pine	0.30	Recondition	Sale Haul Route
286-I	Pine Knob Ridge	1.15	Recondition	Sale Haul Route
286-M	Upper Kay Cr	1.30	Recondition	Sale Haul Route
464	Boundary Ridge Rd	1.00	Recondition	Sale Haul Route
470	Swiftwater	1.00	Recondition	Sale Haul Route
650-A	Mule Point	1.09	Recondition	Sale Haul Route
650-B	Little Mule	0.39	Recondition	Sale Haul Route
650-G	Soaring Falcon	1.00	Recondition	Sale Haul Route
650-H	Hoodoo Falls	1.60	Recondition	Sale Haul Route
650-H1	Hoodoo Jump	1.05	Recondition	Sale Haul Route
650-I	Tiny Tim	0.30	Recondition	Sale Haul Route
650-I1	Raven Pit	0.22	Recondition	Sale Haul Route
650-L	Peg Leg Jim	0.22	Recondition	Sale Haul Route
650-M	Mad Mike	0.47	Recondition	Sale Haul Route
1106-A	West Branch	0.30	Recondition	Sale Haul Route
1106-F1	High West Fork	0.75	Recondition	Sale Haul Route
1106-I	Happy Hoodoo	1.07	Recondition	Sale Haul Route
1106-L	Flying Falcon	0.75	Recondition	Sale Haul Route
1106-M	Howdy doody	0.20	Recondition	Sale Haul Route
1129	Hamby Loop	1.43	Recondition	Sale Haul Route
1160	Rabbit Cr	2.82	Recondition	Sale Haul Route

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
1160-F	Little Rabbit	0.34	Recondition	Sale Haul Route
1160-F1	Short Rabbit	0.10	Recondition	Sale Haul Route
1855-A	S. Fk. Clear Cr Rd A	0.77	Recondition	Sale Haul Route
1855-B	S. Fk. Clear Cr Rd B	0.15	Recondition	Sale Haul Route
1855-C	S. Fk. Clear Cr Rd C	0.09	Recondition	Sale Haul Route
1855-E	S. Fk. Clear Cr Rd E	0.59	Recondition	Sale Haul Route
9409-B	Kay Creek West Spur B	0.50	Recondition	Sale Haul Route
9441	Wall Creek	0.50	Recondition	Sale Haul Route
9441-A	Bald Eagle	1.21	Recondition	Sale Haul Route
9441-A1	Red Hawk	0.20	Recondition	Sale Haul Route
9441-A2	Stage Pit	0.35	Recondition	Sale Haul Route
9482	South Fk Clear Creek	1.12	Recondition	Sale Haul Route
9482-B	No Muddy Water	0.65	Recondition	Sale Haul Route
9483	China Point	1.56	Recondition	Sale Haul Route
9700	Trail 183 Ridge	1.10	Recondition	Sale Haul Route
9700-A	Trail 183 Spur A	0.27	Recondition	Sale Haul Route
9700-B	Trail 183 Spur B	0.43	Recondition	Sale Haul Route
9700-B1	Trail 183 Spur B1	0.27	Recondition	Sale Haul Route
9707	Webers Finale	0.56	Recondition	Sale Haul Route
9712	Pine Knob	0.82	Recondition	Sale Haul Route
9712-A	Pine Knob Spur	0.31	Recondition	Sale Haul Route
9730-A	Cougar Spur A	0.24	Recondition	Sale Haul Route
9730-B	Cougar Spur B	0.70	Recondition	Sale Haul Route
9730-E	Cougar Spur E	0.50	Recondition	Sale Haul Route
9730-H	Cougar Spur H	0.41	Recondition	Sale Haul Route
9730-K	Cougar Knob	0.35	Recondition	Sale Haul Route

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
9734	Upper Middle Fork	1.12	Recondition	Sale Haul Route
9734-A	Upper Middle Fk Spur A	0.29	Recondition	Sale Haul Route
9735-A	Upper Solo Spur A	0.22	Recondition	Sale Haul Route
9737	Tall Center	0.68	Recondition	Sale Haul Route
9737-A	Tall Center Spur A	0.44	Recondition	Sale Haul Route
9740	Middle Fk Clear Cr Spur	0.84	Recondition	Sale Haul Route
77742		0.32	Recondition	Sale Haul Route
77744		0.62	Recondition	Sale Haul Route
77745		0.71	Recondition	Sale Haul Route
77748		0.17	Recondition	Sale Haul Route
77755		0.40	Recondition	Sale Haul Route
77755-A		0.35	Recondition	Sale Haul Route
77755-B		0.37	Recondition	Sale Haul Route
77755-B2		0.25	Recondition	Sale Haul Route
77757		0.40	Recondition	Sale Haul Route
77784		0.59	Recondition	Sale Haul Route
77784-A		0.29	Recondition	Sale Haul Route
77786		0.60	Recondition	Sale Haul Route
77789		0.60	Recondition	Sale Haul Route
77789-A1		0.20	Recondition	Sale Haul Route
77790		0.40	Recondition	Sale Haul Route
Reconstruction—119.8 Miles				
286	Tahoe	24.10	Reconstruction - includes culvert replacement	Sale Haul Route/Watershed/Traffic
286N	Kay Creek East	0.60	Reconstruction - includes culvert replacement	Sale Haul Route
650	West Fork Clear Creek	15.45	Reconstruction - includes culvert replacement	Sale Haul Route/Watershed/Traffic
650A1	Black Mule	0.59	Reconstruction	Sale Haul Route

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
650C	Lost Mule	1.28	Reconstruction	Sale Haul Route
650C1	Red Mule	0.55	Reconstruction	Sale Haul Route
650F	Nesting Falcon	0.90	Reconstruction	Sale Haul Route
1106	Sears Creek	20.22	Reconstruction - includes culvert replacement	Sale Haul Route/Watershed
1106F	Pole Corral	2.76	Reconstruction	Sale Haul Route
1106H	Stinking Water	1.10	Reconstruction	Sale Haul Route
1106I1	Sad Sack	0.52	Reconstruction	Sale Haul Route
1106J	West West Branch	1.47	Reconstruction	Sale Haul Route
1114	Upper Clear Creek	4.50	Reconstruction - includes culvert replacement	Sale Haul Route
1114C	Upper Clear Spur 2	0.48	Reconstruction	Sale Haul Route
1129D	Brown Springs	1.20	Reconstruction	Sale Haul Route
1160D (Sec. 1)	Pack Mule	1.50	Reconstruction - from sale unit to Road 1160, install and remove culvert at West Fork Clear Creek	Sale Haul Route
1160D (Sec. 2)	Pack Mule	0.80	Reconstruction - from 1160-D1 to end of road	Sale Haul Route
1855	Lytle Cow Camp	9.91	Reconstruction - includes culvert replacement	Sale Haul Route/Watershed
1855D	S. Fk. Clear Cr. Rd D	0.69	Reconstruction	Sale Haul Route
1855F	Cowboy Joe	1.01	Reconstruction	Sale Haul Route
1899A	Pine Cone	1.75	Reconstruction	Sale Haul Route
9409	Kay Creek West	1.86	Reconstruction	Sale Haul Route
9442	Voodoo Bill	2.38	Reconstruction	Sale Haul Route
9442A	Chicken Hawk	0.80	Reconstruction	Sale Haul Route
9703	Middle Fork Spur	0.43	Reconstruction	Sale Haul Route
9705	Kay Ridge Spur	2.20	Reconstruction	Sale Haul Route
9730	Cougar Ridge	6.40	Reconstruction	Sale Haul Route
9730D	Cougar Spur D	0.75	Reconstruction	Sale Haul Route
9730J	Cougar Spur J	1.28	Reconstruction	Sale Haul Route
9731	Lost Ridge	2.50	Reconstruction	Sale Haul Route

Road #	Road Name	Miles	Proposed Road Work	Reason For Work
9732	Upper Clear Ck Spur	1.97	Reconstruction	Sale Haul Route
9732-A	Spur West	2.43	Reconstruction	Sale Haul Route
9735	Upper Solo	1.62	Reconstruction	Sale Haul Route
77755B1		0.29	Reconstruction	Sale Haul Route
77758		0.35	Reconstruction	Sale Haul Route
77772		0.43	Reconstruction	Sale Haul Route
77774		1.80	Reconstruction	Sale Haul Route
77774A		0.46	Reconstruction	Sale Haul Route
77785		0.47	Reconstruction	Sale Haul Route

Note: Total mileage of road is included even if only a section is proposed for reconstruction

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Appendix C

Proposed Site-Specific Forest Plan Amendment—Soils

Proposed Site-Specific Forest Plan Amendment—Soils

NEZ PERCE NATIONAL FOREST

LAND AND RESOURCE MANAGEMENT PLAN

AMENDMENT NO. 41 (PROPOSED)

SITE-SPECIFIC AMENDMENT TO SOIL QUALITY STANDARD #2

FOR THE CLEAR CREEK PROJECT AREA

The purpose of this amendment is to allow vegetation activities in areas that currently exceed Forest Plan soil quality standard #2.

The Nez Perce National Forest soil quality standards (Forest Plan II-22) apply to lands in the Clear Creek project area. Soil quality standard #2 currently reads as follows:

> *"A minimum of 80 percent of any activity area shall not be detrimentally compacted, displaced, or puddled upon completion of activities. This direction does not apply to permanent recreation facilities and other permanent facilities such as system roads."*

The following amendment is proposed, specific to the Clear Creek project area:

> *"Where detrimental soil conditions from past activities affect 15 percent or less of the activity area, a cumulative minimum of 85 percent of the activity area shall not be detrimentally compacted, displaced, or puddle upon completion of activities.*
>
> *Where detrimental soil conditions from past activities affect more than 15 percent o the activity area, the cumulative detrimental soil disturbance from project implementation and past activities shall not exceed the conditions prior to the planned activity and shall provide a net improvement in soil quality."*

This guidance is taken from R1 soil quality guidelines found in R1 Supplement No. 2500-99-1 of Forest Service Manual 2500 - Watershed and Air Management.

Analysis of Factors

Soil Standard #2 (Forest Plan II-22) would be amended with a site specific Forest Plan Amendment for the Clear Creek project area on the Moose Creek Ranger District. The amendment would allow vegetation treatments and soil improvement activities to proceed in areas with extensive pre-existing detrimental soil conditions. The amendment takes into account the amount of existing detrimental soil disturbance, and allows the flexibility to achieve multiple resource objectives while showing an upward trend in net soil conditions.

Timing: the amended Soil Standard #2 would be effective until the Forest Plan is revised or amended. The Nez Perce National Forest Plan is scheduled for revision in 2013. The temporal scope of the amendment is therefore limited.

Location and Size: the propose Forest Plan amendment would affect implementation of activities only in the Clear Creek project area. The project area is about 43,730 acres, and is located in Township 30, 31, 32 North, Ranges 5 and 6 East, Boise Principle Meridian. The project area represents less than 2 percent of the total 2,274,146 acres of National Forest System land in the Nez Perce National Forest. The size of area affected is therefore limited.

Proposed activities in the Clear Creek project include soil remediation to achieve a net improvement in proposed treatment units with past soil disturbance. Soil improvement actions can increase water infiltration, increase soil productivity, reduce potential for weed invasion, and stabilize bare slopes. Actions include decompacting soils, recontouring to slope, and adding organic matter, including large woody material. These activities would establish a quicker improving trend for soil conditions; advancing tree growth and vegetation establishment.

Goals, Objectives, and Outputs: The Forest Plan goal for soils is to maintain soil productivity and minimize any irreversible impacts to soil resource. The Forest Plan objective for soils is to maintain soil productivity and minimize soil erosion through the application of best management practices, careful riparian area management, use of fish/water quality drainage objectives, and soil and water resource improvement projects.

This amendment is fully consistent with the goals and objectives of the Nez Perce Forest Plan. Because the amendment would: impose a standard to maintain soil productivity and allow activities to restore areas with considerable pre-existing detrimental soil disturbance. These activities would respond directly and indirectly to the Forest Plan goal and objective for soils. The activities would not inhibit achievement of the Forest Plan goal/objective. This amendment would allow a net improvement in soil condition in the units treated with prior impacts.

This is a site-specific amendment to the Forest Plan soil quality standard #2 for lands in the Clear Creek project area. This site-specific amendment would allow the Clear Creek project to proceed despite the fact that several proposed units currently exceed the 20% compacted, displaced or puddle soils standard.

The soils analysis in the Clear Creek project area found that some units harvested in the 1960 to 1980s using ground based and jammer logging systems, have compacted or displaced soils over more than 20% of the harvested area. Proposed activities for the Clear Creek project include soil remediation activities to achieve a net improvement in proposed vegetation management units. In order to enter these units under the Clear Creek project, an amendment to soil quality standard #2 is needed.

Management Perspective: Amendment of Forest Plan Soil Standard #2 is specific or applicable only to the Clear Creek activity area. This amendment does not apply to activities occurring outside the Clear Creek project area. The proposed change would occur on less than 2 percent of the Forest, therefore there would be no measurable change to goods and service produced in the total forest panning unit (2,274,146 acres, Forest) prior to completion of the Forest Plan revision.

This direction does not apply to permanent recreation facilities and other permanent facilities such as system roads. This amendment would make the Forest Plan standard consistent with Regional soil quality guidelines (USDA 1999).

Purpose and Need of Amendment

Purpose

The purpose of this amendment is to allow activities to occur on areas with greater than 20 percent detrimental soil disturbance.

Need

Past harvest activities have altered soils conditions in the Clear Creek project area. The current Forest Plan standards and the Forest Service Region1 soil quality guidelines provide direction to maintain soil productivity. The proposed amendment would change Forest Plan standard #2, allowing for activities to occur on areas with greater than 20% soil detrimental disturbance, as long as soil improvement activities are implemented.

Based on the current condition a project specific Forest Plan amendment is needed for Alternatives B, C and D to allow for harvest activities to occur on three units of the Clear Creek project.

Direct, indirect and cumulative impact of amendment

Direct and indirect effects

No Action Alternative

Alternative A would not amend the Forest Plan. Soil conditions in three units of the Clear Creek project area would remain detrimentally disturbed. No soil improvement activities would occur.

Action Alternatives

Alternatives B, C and D are evaluated in this analysis, and would require a Forest Plan amendment for soil standard #2. These alternatives would not adjust the goals, objectives or outputs as described in the Forest Plan. This amendment would allow the Clear Creek project to proceed despite the fact that three of the proposed units currently exceed the 20% compacted, displaced or puddle soils standard.

The amendment would allow vegetation treatments and soil improvement activities to proceed in areas with extensive pre-existing detrimental soil conditions. The amendment takes into account the amount of existing detrimental soil disturbance, and allows the flexibility to achieve multiple resource objectives while showing an upward trend in net soil conditions.

Proposed activities in the Clear Creek project include soil remediation to achieve a net improvement in proposed treatment units with past soil disturbance. Soil improvement objectives are to increase water infiltration, increase soil productivity, reduce potential for weed invasion, and stabilize bare slopes. Actions include decompacting soils, recontouring to slope, and adding organic matter, including large woody material. These activities would establish a quicker improving trend for soil conditions; advancing tree growth and vegetation establishment.

This site specific amendment applies to the Clear Creek project area. The amended Soil Standard #2 would be effective until the Forest Plan is revised or amended. The Nez Perce National Forest Plan is scheduled for revision in 2013. The temporal scope of the amendment is therefore limited.

This amendment would make the Forest Plan standard consistent with Regional soil quality guidelines (USDA 1999).

Cumulative effects

There are no cumulative effects with the proposed amendment to the Forest Plan. The amendment is project specific and limited in time.

Application of FSM 1926.51 Directives Not Significant Criteria

The determination of whether this proposed amendment is significant was done using the process in the Forest Service Planning Handbook, 1926.51 (http://www.fs.fed.us/emc/nfma/index5.html). The handbook states changes to the land management plan that are not significant can result from four specific situations. This forest-wide amendment is compared to those situations below:

Table 6. Soils Amendment Criteria Considered

Changes to the land management plan that are not significant	**Alternative B, C, and D** **Forest Plan Soil standard #2 - Amendment**
1. Actions that do not significantly alter the multiple use goals and objectives for long-term land and resource management.	The objectives set forth in the Forest Plan for soils would not be altered. The goal to maintain soil productivity and minimize any reversible impacts to the soil resource would still be met.
2. Adjustments of management area boundaries or management prescriptions resulting from further onsite analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.	The proposed amendment does not alter the multiple-use goals and objectives for long-term land and resource management. The amendment only affects the analysis for this project. It is a project specific amendment that would have no effect to Forest Plan objectives or outputs.
3. Minor changes in standards and guidelines.	This amendment would only apply to the Clear Creek project. All other soil goals and standards would apply to this project. This amendment alters soil standard #2 to be consistent with regional soil guidelines.
4. Opportunities for additional projects or activities that will contribute to achievement of the management prescription.	Future projects would follow the current Forest Plan standard. This amendment would not adjust management area boundaries or management prescriptions in future analyses.

Conclusion – Significance/Non-Significance

The preliminary determination is that the adoption of this amendment to the Nez Perce National Forest Plan, soil standard #2, is not significant. This conclusion is based on consideration of the four factors identified in the Forest Service Planning handbook, 1926.51 and review of the Forest Plan. This amendment is fully consistent with the current Forest Plan goals and standards and Region 1 soil quality guidance.

Appendix D

Proposed Site-Specific Forest Plan Amendment—Old Growth

Proposed Site-Specific Forest Plan Amendment—Old Growth

NEZ PERCE NATIONAL FOREST

LAND AND RESOURCE MANAGEMENT PLAN

AMENDMENT NO. 42 (PROPOSED)

SITE-SPECIFIC AMENDMENT TO APPENDIX N

FOR THE CLEAR CREEK PROJECT AREA

The purpose of this amendment is to replace the Forest Plan Appendix N definitions of old growth with the definitions found in Old Growth Forest Types of the Northern Region (Green, et al., 1992, errata corrected 02/05, 12/07, 10/08, 12/11). The Green et al. definitions are regarded as the "best available science" for the classification of old growth at the site-specific level.

This nonsignificant amendment is site-specific, and would apply only to the Clear Creek Integrated Restoration Project action alternatives. This amendment would not apply to any activities or projects outside the project area.

This amendment would not change the Forest Plan objective for MA 20, which is to maintain viable populations of old-growth-dependent wildlife species. "At least 10 percent of the forested acres across the Forest that are suitable old-growth habitat will be managed as old-growth habitat. This acreage will be distributed across the Forest in a way which assures that at least 5 percent of the forested acres within major prescription watersheds of 6,000 to 10,000 acres will be managed as old-growth habitat." (USDA-FS 1987, page II-6).

Adopting the definitions for old growth found in Green et al. that define successional stages, stratification by habitat types, and other site conditions would help refine our interpretation of the old growth characteristics described in Appendix N of the Forest Plan.

Additionally, adoption of this amendment would ensure consistent terminology and analysis. Old growth determination is done through data collection in accordance with Region One stand exam protocols that correlate to the definitions found in Green et al.

Literature cited:

Green, Pat; Joy, John; Sirucek, Dean; Hann, Wendell; Zack, Art; Naumann, Bob. 1992. Old-Growth Types of the Northern Region. U.S Department of Agriculture, Forest Service, Northern Region. (errata corrected 02/05, 12/07, 10/08, 12/11).

TABLE 1 NORTHERN IDAHO ZONE OLD GROWTH TYPE CHARACTERISTICS *(2/05 errata edit)*

DESCRIPTION		MINIMUM CRITERIA			ASSOCIATED CHARACTERISTICS						
OLD GROWTH TYPE	HABITAT TYPE GROUP	MINIMUM AGE OF LARGE TREES	MINIMUM NUMBER TPA/DBH	MINIMUM BASAL AREA (FT^2/AC)	DBH VARIA-TION 2/	PERCENT DEAD/ BROKEN TOP 1/	PROB-ABILITY OF DOWN WOODY 2/	PER-CENT DECAY 1/	NUMBER CANOPY LAYERS 3/	SNAGS ≥9" DBH 1/	NUMBER OF SAMPLES
1 - PP, DF, L	A,B	150	8 ≥ 21"	40	M	0 - 30	L - M	0-8	SNGL/MLT	0 - 13	815
2 – LP	B,C,D,E,G,H,I,J,K	120	10 ≥ 13"	60	M	0-19	M	2-13	SNGL/MLT	1 - 37	875
3 - Y	C,C1, G1	150	3 ≥ 21"	80	M	7 - 10	H	9-34	SNGL/MLT	5	26
4A - DF, GF, L, SAF, WP, PP	C, C1,D,E	150	10 ≥ 21"	80	M	3 - 28	M	2 –33	SNGL/MLT	7 - 35	2,938
4B - DF,GF, L, WH, WP, PP	F,G,G1,H,I	150	10 ≥ 21"	120 / 80 (4)	M - H	0 - 22	M - H	1- 41	SNGL/MLT	0 - 33	8,069
5 – SAF,MAF	F,G, G1,H,I	150	10 ≥ 17"	80	H	5 - 36	H	5-28	MULTIPLE	6 - 36	4,275
6 – WBP	I, J, K	150	5 ≥ 13"	60 / 40 (5)	M	0 - 17	M	6-17	SNGL/MLT	11 - 42	43
7 – C	F,G,G1	150	10 ≥ 25" (6)	120	M	5 - 36	L - H	6-55	SNGL/MLT	6 - 47	5,865
8 – DF,L, SAF,MAF,WP	J	150	10 ≥ 17"	60	M	1 - 14	M - H	1-15	SNGL/MLT	3 - 40	890
9 – SAF,MAF	K	150	5 ≥ 13"	40	H	21 - 23	M	13-35	MULTI	11 - 13	26

1/ These values are not minimum criteria. They are the range of means for trees ≥9" DBH across plots within forests, forest types, or habitat type groups.

2/ These are not minimum criteria. They are Low, Moderate, and High probabilities of abundant large down woody material or variation in diameters based on stand condition expected to occur most frequently.

3/ Not a minimum criteria. Number of canopy layers can vary within an old growth type with age, relative abundance of different species and successional stage.

4/ In Old Growth Type 4B, 120 ft^2 applies to habitat type groups F, G, and G1, and 80 ft^2 of basal area applies to habitat type groups H & I.

5/ In whitebark pine forest type, 60 ft^2 of basal area applies to habitat type groups I and J, and 40 ft^2 applies to habitat type group K.

6/ In Old Growth Type 7, the 25" minimum DBH only applies to cedar trees; old trees of other species are evaluated with a minimum DBH appropriate for that species on these habitat types (21" for DF, GF, L, WH, WP, PP; and 17" for SAF, MAF)

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Appendix C - Chief's Definition and Action Plan

10/11/89

POSITION STATEMENT ON
NATIONAL FOREST OLD GROWTH VALUES

The Forest Service recognizes the many significant values associated with old growth forests, such as biological diversity, wildlife and fisheries habitat, recreation, aesthetics, soil productivity, water quality, and industrial raw material. Old growth on the National Forests will be managed to provide the foregoing values for present and future generations. Decisions on managing existing old growth forests to provide these values will be made in the development and implementation of forest plans These plans shall also provide for a succession of young forests into old growth forests in light of their depletion due to natural events or harvest.

Old growth forests encompass the late stages of stand development and are distinguished by old trees and related structural attributes. These attributes, such as tree size, canopy layers, snags, and down trees, generally define forests that are in an old growth condition. The specific attributes vary by forest type. Old growth definitions are to be developed by forest type or type groups for use in determining the extent and distribution of old growth forests.

Where goals for providing old growth values are not compatible with timber harvesting, lands will be classified as unsuitable for timber production. Where these goals can be met by such measures as extending the final harvest age well beyond the normal rotation or by using silvicultural practices that maintain or establish specific old growth values, lands will be classified as suitable for timber production. In making these determinations, consideration shall be given to the extent and distribution of old growth on National Forest lands that are Congressionally or administratively withdrawn from timber harvest, as well as adjacent ownerships.

Old growth values shall be considered in designing the dispersion of old growth. This may range from a network of old growth stands for wildlife habitat to designated areas for public visitation. In general, areas to be managed for old growth values are to be distributed over individual National Forests with attention given to minimizing the fragmentation of old growth into small isolated areas. Old growth on lands suitable for timber production and not subject to extended rotations is to be scheduled for harvest to establish young stands which more fully utilize potential timber productivity and also meet other resource objectives.

Regions with support from Research shall continue to develop forest type old growth definitions, conduct old growth inventories, develop and implement silvicultural practices to maintain or establish desired old growth values, and explore the concept of ecosystem management on a landscape basis. Where appropriate, land management decisions are to maintain future options so the results from the foregoing efforts can be applied in subsequent decisions. Accordingly, field units are to be innovative in planning and carrying out their activities in managing old growth forests for their many significant values.